

UEE62122

Advanced Diploma of Engineering Technology

Electrical

Assessment Mapping+ Student Assessment Guide

+Assessment Observation



Australian Government

**UEE62122 Advanced Diploma of
Engineering Technology - Electrical**

Release: 2

UEE62122 Advanced Diploma of Engineering Technology – Electrical

The units highlighted by the following colours have been planned to deliver.

The study materials, online resources , practicals and assessment tools have been developed.

Red Colour- Advanced Electrical Units

**Green Colour-The units common to UEE30820 CIII
Electrotechnology-Electrician Course**

**Blue Colour-The units which are based on UEE30820 CIII
Electrotechnology-Electrician Course by adding additional contents**

**Purple Colour indicates that the telecommunication units being offered at the
college**

Qualification Description

This qualification covers competencies to design and validate/evaluate electrical equipment and systems and provide technical advice/sales.

No licensing, legislative or certification requirements apply to this qualification at the time of publication.

Entry Requirements

There are no entry requirements for this qualification.

Packaging Rules

A total of **2160 weighting points** comprising:

1200 core weighting points listed below; plus

960 general elective weighting points from the general elective units listed below.

Choose a total of **960 weighting points** elective units from the list below, of which between **0 and 440 weighting points** can be taken from Group A; between **0 and 300 weighting points** can be taken from Group B; between **0 and 300 weighting points** can be taken from Group C; between **0 and 300 weighting points** can be taken from Group D; and between **200 and 960 weighting points** can be taken from Group E (or all **960 elective weighting points** can be taken from Group E).

Up to **360 weighting points** of the general elective units Group A, may be selected, with appropriate contextualisation, from any relevant nationally endorsed Training Package or accredited course, provided selected units contribute to the vocational outcome of the qualification. Previously assigned weighting points are listed in the UEE Electrotechnology Training package Companion Volume Implementation Guide (CVIG), if not listed weighting points will be 10 points, unless directed from the Electrotechnology Industry Reference Committee (IRC).

There are units of competency within this qualification that contain pre-requisites. Units of competency that have a pre-requisite requirement are identified by this symbol *. Refer directly to the units of competency to identify pre-requisite requirements to ensure all are complied with. A list of all pre-requisites is also provided in the UEE Pre-requisite Companion Volume.

Where imported units are selected, care must be taken to ensure all pre-requisite units specified are complied with.

Core units		Weighting Points
UEECD0003	Apply industry and community standards to engineering activities	20
UEECD0004	Apply material science to solving electrotechnology engineering problems	60
UEECD0005	Apply physics to solving electrotechnology engineering problems	60
UEECD0007	Apply work health and safety regulations, codes and practices in the workplace	20
UEECD0010	Compile and produce an energy sector detailed report	60
UEECD0014	Develop design briefs for electrotechnology projects	40
UEECD0026	Manage risk in electrotechnology activities	60
UEECD0036	Provide engineering solutions for problems in complex multiple path circuits	60
UEECD0039	Provide solutions to basic engineering computational problems*	60
UEECD0044	Solve problems in multiple path circuits*	40
UEECD0046	Solve problems in single path circuits *	40
UEECD0056	Apply methods to maintain currency of industry developments	20

UEECD0059	Write specifications for electrical engineering projects	40
UEECD0064	Interpret, produce and modify electrotechnology drawings	40
UEEEL0015	Manage large electrical projects*	40
UEEEL0019	Solve problems in direct current (d.c.) machines*	30
UEEEL0020	Solve problems in low voltage a.c. circuits*	80
UEEEL0021	Solve problems in magnetic and electromagnetic devices*	30
UEEEL0058	Plan large electrical projects*	60
UEEEL0062	Provide engineering solutions to problems in complex polyphase power circuits*	60
UEEEL0077	Evaluate and report on the performance of LV machines *	100
UEEEL0079	Plan and analyse LV electrical apparatus	60
UEEEL0080	Plan and analyse wiring systems, circuits, control and protection for electrical installations	100
UEERE0013	Develop strategies to address environmental and sustainability issues in the energy sector	20
TOTAL POINTS		
A=100		
B=140 to 260		
C=180		
D=120		
E= 360		
TOTAL = 900 to 1020		

Group A: Imported and common elective units	100 points	Weighting Points
BSBINS501	Implement information and knowledge management systems	50
BSBLDR522	Manage people performance	70

BSBOPS203	Deliver a service to customers	20
BSBSTR501	Establish innovative work environments	50
BSBSTR502	Facilitate continuous improvement	60
BSBTWK502	Manage team effectiveness	60
ICTICT214	Operate application software packages	20
ICTPRG440	Apply introductory programming skills in different languages	60
ICTPRG443	Apply intermediate programming skills in different languages	80
UEECD0019	Fabricate, assemble and dismantle utilities industry components*	40
UEECD0020	Fix and secure electrotechnology equipment*	20
UEECD0035	Provide basic instruction in the use of electrotechnology apparatus	20
UEECD0051	Use drawings, diagrams, schedules, standards, codes and specifications*	40
UEECO0002	Maintain documentation	20
UEECO0015	Provide quotations for installation or service jobs	20
UEECO0017	Source and purchase material/parts for installation or service jobs	20
Group B: General elective units (140 to 260 points)		Weighting Points
ICTPRG302	Apply introductory programming techniques	40
MEM30027A	Prepare basic programs for programmable logic controllers	40
UEECD0016	Document and apply measures to control WHS risks associated with electrotechnology work*	20
UEECD0017	Establish and follow a competency development plan in an electrotechnology engineering discipline	120
UEECD0025	Lay wiring/cablings and terminate accessories for	40

extra-low voltage (ELV) circuits*		
UEECD0028	Plan an integrated cabling installation system*	40
UEECD0030	Prepare electrotechnology/utilities drawings using manual drafting and CAD equipment and software*	60
UEECD0031	Prepare engineering drawings using manual drafting and CAD for electrotechnology applications*	60
UEECS0033	Use engineering applications software on personal computers	40
UEEDV0005	Install and maintain cabling for multiple access to telecommunication services*	80
UEEDV0008	Install, modify and verify coaxial and structured communication copper cabling*	40
UEEEC0003	Assemble and set up basic security systems*	80
UEEEC0060	Repairs basic electronic apparatus faults by replacement of components*	40
UEEEC0075	Troubleshoot single phase input d.c power supplies*	40
UEEEL0004	Carry out basic repairs to electrical components and equipment*	40
UEEEL0016	Provide advice on effective and energy efficient lighting products	20
UEEEL0022	Supply effective and efficient lighting products for domestic and small commercial applications*	40
UEEEL0061	Provide advice on the application of energy efficient lighting for ambient and aesthetic effect*	20
UEEIC0002	Assemble, enter and verify operating instructions in microprocessor equipped devices*	20
UEEIC0011	Develop electrical integrated systems*	20
UEEIC0013	Develop, enter and verify discrete control programs for programmable controllers*	60
UEEIC0024	Plan the electrical installation of integrated	20

	systems*	
UEEIC0025	Provide solutions to extra-low voltage (ELV) electro-pneumatic control systems and drives*	60
UEEIC0047	Use instrumentation drawings, specifications, standards and equipment manuals*	40
UEERE0054	Conduct site survey for grid-connected photovoltaic and battery storage systems	30
UEERE0055	Conduct site survey for off-grid photovoltaic/generating set systems	40

Group C: General elective units 120 to 180 points

Weighting Points

UEECD0024	Implement and monitor energy sector WHS policies and procedures	20
UEECO0001	Estimate electrotechnology projects	40
UEEEL0007	Develop detailed electrical drawings*	60
UEEEL0036	Design effective and efficient lighting for residential and commercial buildings*	20
UEEEL0060	Prepare quotations for the supply of effective and efficient lighting products for lighting projects*	20
UEEEL0063	Provide photometric data for illumination system design	60
UEEEL0070	Select effective and efficient light sources and luminaries for given locations and designs*	60
UEEIC0009	Develop an electrical integrated system interface for access through a touch screen*	20
UEEIC0012	Develop structured programs to control external devices*	40
UEEIC0014	Develop, enter and verify programs in supervisory control and data acquisition systems*	60
UEEIC0015	Develop, enter and verify word and analogue control programs for programmable logic	60

	controllers*	
UEERE0061	Design grid-connected photovoltaic power supply systems*	60
UEERE0060	Design grid-connected battery storage systems*	60
Group D: General elective units (120 points)		Weighting Points
ICTNWK426	Install and configure client-server applications and services	60
UEECD0013	Develop and implement energy sector maintenance programs	60
UEECD0032	Produce detailed electrotechnology/utilities drawings using CAD equipment and software *	60
UEECO0014	Prepare tender submissions for electrotechnology projects*	60
UEECS0004	Commission industrial computer systems*	20
UEECS0016	Develop energy sector directory services*	80
UEECS0025	Modify/redesign industrial computer systems*	20
UEEEL0006	Develop detailed and complex drawings for electrical systems using CAD systems*	60
UEEEL0011	Evaluate performance of low voltage electrical apparatus*	40
UEEEL0035	Design effective and efficient lighting for public, open and sports areas*	20
UEEIC0005	Configure and maintain industrial control system networks*	60
UEEIC0010	Develop and test code for microcontroller devices	60
UEEIC0051	Evaluate motor drive systems and diagnose faults *	120
UEERE0062	Design micro-hydro systems*	60
UEERE0064	Design renewable energy heating systems*	120
UEERE0065	Design wind energy systems *	60

Group E: General elective units (360 points)		Weighting Points
ICTPRG430	Apply introductory object-oriented language skills	60
ICTPRG549	Apply intermediate object-oriented language skills	60
MEM234014A	Design a robotic system	40
UEECD0001	Analyse materials for suitability in electrical equipment*	80
UEECD0002	Analyse static and dynamic parameters of electrical equipment	80
UEECD0012	Contribute to risk management in electrotechnology systems	20
UEECD0015	Develop engineering solutions to photonic system problems*	80
UEECD0037	Provide engineering solutions for uses of materials and thermodynamic effects	80
UEECD0049	Use advanced computational processes to provide solutions to energy sector engineering problems*	80
UEECO0003	Manage contract variations	40
UEECS0015	Develop energy sector computer network applications infrastructure	80
UEEEEC0005	Assess electronic apparatus compliance	60
UEEEEC0011	Design and develop electronics/computer systems projects	40
UEEEEC0014	Design signal-conditioning sub-systems	80
UEEEEC0045	Modify digital signal processing (DSP) based sub-systems	80
UEEEL0041	Develop engineering solution for synchronous machine and control problems*	60

UEEEL0042	Develop engineering solutions for d.c. machine and control problems*	60
UEEEL0043	Develop engineering solutions for induction machine and control problems*	60
UEEIC0006	Design and configure Human-Machine Interface (HMI) networks	60
UEEIC0007	Design and use advanced programming tools, PC networks and HMI Interfacing	120
UEEHA0017	Classify areas where a combustible dust hazard may arise	60
UEEHA0018	Classify areas where flammable gas or vapour hazards may arise	60
UEERE0059	Design energy management controls for electrical installations in buildings*	80
UEERE0066	Develop effective engineering strategies for energy reduction in buildings*	60
UEERE0063	Design off-grid photovoltaic/generating set systems *	40
UEERE0067	Develop engineering solutions to renewable energy (RE) problems*	60

Qualification Mapping Information

This qualification replaces and is not equivalent to UEE62120 Advanced Diploma of Engineering Technology - Electrical.

Links

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>

Assessment Mapping - Template

(streamlined training package)

This template to be used for “new” endorsed streamlined training packages.

Instruction for use: These instructions in RED should be deleted from the completed document. Instructions in BLUE should be written over with appropriate information.

- This template is to be completed by the assessment developer to ensure the assessments meet the training package requirements for the unit of competency.
- It must be used during the assessment validation process.
- Record of this document must be retained in the faculty TAS teamshare teaching section.
- Add rows and columns as required below.

This document should be viewed concurrently with UENEEG033A/UEEEL0008/0009/0010- Assessment Mapping+Question+Marking Guide+Observation.pdf

Faculty:		College:	
Teaching Section:	Electrical Engineering		
Qualification Number and Name:	UEE62122 Advanced Diploma of Engineering Technology-Electrical/ UEE62220 Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEEEL0079 Plan and analyse LV electrical apparatus		

Copy and paste the following table for each element as required

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
1 Prepare to plan and analyse single and three phase low voltage electrical apparatus	1.1	Work, health and safety (WHS) / occupational health and safety (OHS) risk control measures are identified and applied	Q1 to 5 of UEENEEG033A- Assessment Mapping+Question+ Marking Guide+Observation.pdf (Page 1,2)		
			Q5 to 7 of UEENEEG033A- Assessment Mapping+Question+ Marking Guide+Observation.pdf (Page 2,3)		
			Q5 to 7 of UEENEEG033A- Assessment Mapping+Question+ Marking Guide+Observation.pdf (Page 2,3)		
	1.2	Apparatus to be analysed, and scope of work to be undertaken are identified and confirmed		Practical 1 of UEENEEG033A- Assessment Mapping+Question+ Marking Guide+Observation.pdf (Page 4)	

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
	1.3	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety		Observation Practical 1 of UEENEEG033A- Assessment Mapping+Question+ Marking Guide+Observation.pdf (Page 4)	
				Practical 2 to 5 of UEENEEG033A- Assessment Mapping+Question+ Marking Guide+Observation.pdf (Page 5 to 8)	
				Practical 6 to 9 of UEENEEG033A- Assessment Mapping+Question+ Marking Guide+Observation.pdf (Page 8 to 10)	
2 Plan and analyse single and three phase low voltage electrical apparatus	2.1	Apparatus is confirmed as being isolated where necessary in accordance with WHS/OHS requirements	As per 1.1 to 1.3		
				Practical 10 UEENEEG033A- Assessment Mapping+Question+	

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
				Marking Guide+Observation.pdf (Page10)	
	2.2	Apparatus is analysed using measured and calculated values as they apply to single and three-phase low voltage apparatus	Test 1 G033+G063 Question + Marking Guide 1+2 Part (A) Q 1 to 20 Part (B) Q1 to 10		
	2.3	Apparatus problems are identified from analysis and solutions for rectification are recommended	As above		
	2.6	The use of apparatus in a specified electrical installation is planned in accordance with requirements	As above		
3 Complete work and document problem solving activities.	3.1	Results of analysis are recorded	Test 2 G033+G063 Question + Marking Guide 2 Q 1 to 5		
	3.2	Justification for apparatus selection and installation planning is documented	As above		
	3.3	Work completion is documented and stored in an appropriate location	Q 8 to 10 of UEENEEG033A- Assessment Mapping+Question+ Marking Guide+Observation.pdf (Page 12,13)		

Add rows to the following table as required

Performance Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Following OHS Procedures/ OHS Sign Interpretation/ Risk Assessment & Control/ OHS Report	Q1 to 7 of UEENEEG033A- Assessment Mapping+Question+ Marking Guide+Observation.pdf (Page 1,2)		
Lighting & Power Point Wiring		Practical 1	
Switch board & Main supply installation		Practical 2 to 5	
Circuit Safety Testing- Polarity/ Continuity/ Transposition		Practical 6 to 9	
Life testing		Practical 10	

Add rows to the following table as required

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T1 Lighting circuits	Test 1 Part B -Q1		
T2 Circuits for socket outlets	Test 1 Part B -Q2		
T3 Final sub-circuits and segregation	Test 1 Part B-Q4		
T4 Electrical heating control devices+ T5 Fixed electrical heating appliances+ T6 Electrical water heater operation	Test 1 Part B-Q9		
T7 Alternative supplies+ T8 Installation of batteries+ T9 Fire protection+ T10 Emergency and evacuation lighting	Test 1 Part B-Q6/7		
T11 Lighting concepts+ T12 Fluorescent low intensity+ T13 High intensity discharge lighting	Test 1 Part B -Q3		
Understanding of Electrical Wiring Technical Terms+ Respective AS3000 Rules	Test 1 Part A- Q 1 to 20		

Add rows to the following table as required

Assessment Conditions	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the welectrical workshop K2.11. Application of safe working practice & regarding the housekeeping rules are to be observed. Emergency procedures are to be informed. Safety equipments & first aids equipments are to be available. The students get the access to <ul style="list-style-type: none"> • Relevant practical equipments • Records relating to electrical engineering resources 	Test 1 + 2	Practical 1 to 10	

Created by (Name)	U Kyaw Naing (Joe)	Date created	
Approved by (Name)		Date approved	
Signature		Date modified	

Assessment Mapping - Template

(streamlined training package)

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This document should be viewed concurrently with [E108A+G106A Assessment Mapping+Performance+Marking Guide.pdf](#)

Click [HERE](#)

Faculty:		College:	
Teaching Section:	Electrical Engineering		
Qualification Number and Name:	UEE62122 Advanced Diploma of Engineering Technology-Electrical/ UEE62220 Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEECD0025 Lay wiring/cabling and terminate accessories for extra-low voltage (ELV) circuits		

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
1. Prepare to lay wiring/cabling and connect accessories for extra-low voltage circuits.	1.1	Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures are identified and applied	Q1+2 of E108A+G106A Assessment Mapping+ Performance +Marking Guide.pdf (Page 1+2)		
	1.2	Hazards are identified, risks are assessed and control measures are implemented	Q3 of E108A+G106A Assessment Mapping+ Performance +Marking Guide.pdf (Page 3)		
	1.3	Safety hazards not previously identified are reported on job safety assessment and advice on risk control measures is sought from the work supervisor			Q4 of E108A+G106A Assessment Mapping+ Performance +Marking Guide.pdf (Page 3)
	1.4	Location of work is obtained from relevant person/s to determine scope of work		Practical 1 Task 1a	
	1.5	Advice is sought from relevant person/s to ensure work is coordinated with others		Practical 1 Task 1b	
	1.6	Sources of materials required for work are determined in accordance with workplace procedures		Practical 1 Task 1c	
	1.7	T Tools, equipment and testing devices required for work are obtained in accordance with workplace procedures and checked for correct operation and safety		Practical 1 Task 1d	

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
2.Lay wiring/cabling and connect accessories for extra-low voltage circuits.	2.1	WHS/OHS workplace risk control measures for carrying out the work are followed	As per 1.1+1.2+1.3		
	2.2	Circuits/machines/plant are checked as isolated in accordance with workplace procedures		Practical 1 Task 2	
	2.3	Wiring and accessories are installed to comply with industry standards and job specifications with sufficient excess to affect terminations		Practical 1 Task 3	
	2.4	Accessories are installed straight and square in the required locations and within acceptable tolerances		Observation in practical task	
	2.5	Cables and conductors are terminated at accessories in accordance with manufacturer specifications and relevant industry standards		Observation in practical task	
	2.6	Cables installed for future service are marked and terminated in compliance with relevant industry standards and workplace procedures		Observation in practical task	
	2.7	Unplanned events are responded to in accordance with workplace procedures and approval of immediate supervisor		Activity 1- Reacting the emergency	
	2.8	Cable installation and termination is carried out without wasting materials, damaging apparatus, circuits or the surrounding environment using sustainable energy practices		Observation in practical task	
3.Complete and report work activities.	3.1	WHS/OHS completion risk control measures and workplace procedures are followed	As per 1.1+1.2+1.3		
	3.2	Worksite is cleaned and made safe in accordance with workplace procedures		Activity 2- Housekeeping	

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
				Activity	
	3.3	Work completion is documented and relevant person/s notified in accordance with workplace procedures		Activity 3-Testing	Activity 4-Reporting

Add rows to the following table as required

Performance Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Cable colour coding	Q3 of E108+137+G108 Test Question		
Safety sign interpretation		Practical 1 Task 1	
Conduit wiring		Practical 1 Task 1	
Lighting wiring		Practical 1 Task 1	
Wiring the socket outlet		Practical 1 Task 1	
Cable termination/ connection		Practical 1 Task 1	
Testing		Activity 3-Testing	

Add rows to the following table as required

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
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Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Drawing the light control circuit T3 Installing cables in buildings, structures and premises T5 Technical standards, regulations and codes	Q1 of E108+137+G106 Test Question		
Drawing the power control circuit T3 Installing cables in buildings, structures and premises T5 Technical standards, regulations and codes	Q2 of E108+137+G106 Test Question		
Types of cables T2 Types of cables used in the electrotechnology industry	Q4 of E108+137+G106 Test Question		
Wiring accessories T1 Cable protection and support method and accessories	Q5 of E108+137+G106 Test Question		
Tools & equipments for wiring T6 Environmental and heritage regulation	Q6 of E108+137+G106 Test Question		
Cable termination tools T4 Basic cable and conductor terminations	Q7 of E108+137+G106 Test Question		
Wire crimping T4 Basic cable and conductor terminations	Q8 of E108+137+G106 Test Question		
Cable lugging tools+ Crimping tools	Q9 +10 of E108+137+G106 Test Question		
Continuity testing	Q11 + 12 of E108+137+G106 Test Question		
Insulation Resistance Test	Q13 of E108+137+G106 Test Question		
Interpretation of wiring diagram	Q14 of E108+137+G106 Test Question		

Add rows to the following table as required

Assessment Conditions	Assessment event 1 Written Test	Assessment event 2 Practical &	Assessment event 3 Assignment
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		Observation	
<p>. Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the welectrical workshop K2.11. Application of safe working practice & regarding the housekeeping rules are to be observed. Emergency procedures are to be informed. Safety equipments & first aids equipments are to be available. The students get the access to</p> <ul style="list-style-type: none"> • Relevant practical equipments • Records relating to electrical engineering resources 	Q 1 to 6 +13+14 of E108+E137+G106 Test	Practical 1 Task a to d Activities 1/2/3/4	

Created by (Name)	U Kyaw Naing (Joe)	Date created	
Approved by (Name)		Date approved	
Signature		Date modified	

UEENEEE108A Lay wiring/cabling and terminate accessories for extra-low voltage (ELV) circuits

UEENEEG106A Terminate cables, cords and accessories for low voltage circuits

UNIT CAPSTONE ASSESSMENT











ASSESSMENT QUESTIONS & TESTS ARE BASED ON THE FOLLOWINGS, THEY ARE MODIFIED, EXTRACTED SOME PARTS, APPLIED THE SIMILAR ONES, ALTER AND UTILIZED IN ASSESSMENT TASKS & THEORY TESTS FROM TIME TO TIME.

1. Prepare to lay wiring/cabling and connect accessories for extra-low voltage circuits.

1.1

OHS procedures for a given work area are obtained and understood through established routines and procedures.

Q1. Identify safety equipments & signs to be used when you are using fitting & machining

<p>FIRE</p>  <p>BRAND</p>		<p>SL MSF1 - LOCATION OF FIRE FIGHTING EQUIPMENT SL MSF2 - FIRE EXTINGUISHER SL MSF3 - FIRE HOSE SL MSF4 - FIRE HYDRANT SL MSF5 - FIRE ALARM SL MSF6 - SPRINKLER STOP VALVE</p>
<p>MANDATORY</p>  <p>VERPLIGTEND</p>		<p>SL MSM1 - EYE PROTECTION SHALL BE WORN SL MSM2 - RESPIRATORY PROTECTION SHALL BE WORN SL MSM3 - HEAD PROTECTION SHALL BE WORN SL MSM4 - HEARING PROTECTION SHALL BE WORN SL MSM5 - HAND PROTECTION SHALL BE WORN SL MSM6 - FOOT AND LEG PROTECTION AGAINST LIQUIDS SHALL BE WORN SL MSM7 - FOOT PROTECTION AGAINST CRUSHING SHALL BE WORN SL MSM8 - FLAME SAFETY LAMP SHALL BE USED SL MSM9 - APRON SHALL BE WORN SL MSM10 - ACE PROTECTION SHALL BE WORN SL MSM11 - AIR-SUPPLIED HOOD SHALL BE WORN SL MSM12 - DUST MASK SHALL BE WORN SL MSM13 - AIR EXTRACTION SHALL BE WORN SL MSM14 - WASTE BINS SHALL BE USED SL MSM15 - FULL BODY WEAR SHALL BE WORN SL MSM16 - SAFETY HARNESS SHALL BE USED</p>
<p>INFORMATION</p>  <p>INLIGTING</p>		<p>SL MSG1 - FIRST AID EQUIPMENT SL MSG2 - GENERAL DIRECTION SL MSG3 - DIRECTION TO ESCAPE ROUTE SL MSG4 - DIRECTION TO ESCAPE ROUTE SL MSG5 - MANNED FIRST-AID STATION SL MSG6 - DRINKING WATER SL MSG7 - BLASTING POINT SL MSG8 - TRAVELING WAY SL MSG9 - LOCOMOTIVE REFUELLING POINT SL MSG10 - LATRINE FOR MALE EMPLOYEES SL MSG11 - REFUGE CHAMBER SL MSG12 - TELEPHONE SL MSG13 - WAITING PLACE SL MSG14 - EMERGENCY TELEPHONE SL MSG15 - ELECTRICAL ISOLATOR</p>
<p>PROHIBITORY</p>  <p>VERBODE</p>		<p>SL MSP1 - SMOKING PROHIBITED SL MSP2 - FIRE AND OPEN FLAMES PROHIBITED SL MSP3 - THOROUGHFARE FOR PEDESTRIANS PROHIBITED SL MSP4 - WATER AS EXTINGUISHER PROHIBITED SL MSP5 - DRINKING OF THIS WATER PROHIBITED SL MSP6 - PROCEEDING BEYOND THIS SIGN PROHIBITED SL MSP7 - CYCLING PROHIBITED SL MSP8 - CARRYING OF LONG MATERIAL / OBJECTS PROHIBITED SL MSP9 - HAND TRAMMING PROHIBITED SL MSP10 - LOCOMOTIVES PROHIBITED BEYOND THIS POINT SL MSP11 - USE OF COMPRESSED AIR PROHIBITED SL MSP12 - LOOSE CLOTHING, TIES, JEWELLERY AND UNCONFINED LONG HAIR PROHIBITED</p>
<p>WARNING</p>  <p>WAARSKUWING</p>		<p>SL MSW1 - GENERAL WARNING OF DANGER SL MSW2 - WARNING OF FIRE HAZARD SL MSW3 - WARNING OF EXPLOSION HAZARD SL MSW4 - WARNING OF CORROSION HAZARD SL MSW5 - WARNING OF POISONING SUBSTANCES HAZARD SL MSW6 - WARNING OF IONISING RADIATION HAZARD SL MSW7 - WARNING OF ELECTRICAL SHOCK HAZARD SL MSW8 - WARNING OF SUSPENDED LOADS HAZARD SL MSW9 - WARNING OF METHANE HAZARD SL MSW10 - WARNING OF FRAGILE ROOF SL MSW11 - WARNING OF BIOLOGICAL HAZARD SL MSW12 - WARNING OF LASER SL MSW13 - WARNING OF FALLING OBJECTS HAZARD</p>

process.

[Answers +Marking Guide \(2 marks\)](#)

- Safety glass
- Safety glove
- Safety shoe
- Ear protection

First aids sign

Q2 Write the safety procedure to operate the drilling machine

[Answers +Marking Guide \(5 marks\)](#)

PRE-OPERATIONAL SAFETY CHECKS

1. Check workspace and walkways to ensure no slip-hazards are present.
2. Check that the drill chuck guard is in position.
3. Ensure the chuck key (if used) has been removed from the drill chuck.
4. Locate and ensure you are familiar with the operation of the ON/OFF starter and E-Stop (if fitted).
5. Follow correct clamping procedures to ensure work is secure.
6. If the job obstructs the walkway erect a barricade.
7. Adjust spindle speed to suit drill or cutter diameter.
8. Faulty equipment must not be used. Immediately report suspect equipment.

OPERATIONAL SAFETY CHECKS

1. Never leave the Drill Press while it is running.
2. Before making adjustments or before cleaning swarf accumulations switch off and bring the machine to a complete standstill.
3. Feed downwards at a sufficient rate to keep the drill cutting.
4. Feed with care as the drill breaks through the underside of the work.
5. Use a safe working posture (beware of hair catching).

HOUSEKEEPING

1. Switch off the machine.
2. Leave the machine in a safe, clean and tidy state.

POTENTIAL HAZARDS

- Hair/clothing entanglement - rotating spindle/drill
- Eye injuries
- Flying swarf/chips
- Sharp edges & burrs

1.2

Established OHS risk control
measures and procedures

Q3 What are the main source of hazards to use the drilling machine?

Answers +Marking Guide (5 marks)

(1)Hazards related to the machinery or plant, materials or items being processed or internal sources of energy, for example:

- drawing in or trapping hazards;
- entanglement hazards;
- shearing hazards;
- cutting hazards;
- impact hazards;

(2)hazards related to the location of the machine or plant, for example:

- its stability, for instance, whether it could roll or fall over;

(3)hazards related to systems of work associated with the machine or plant, for example manual handling injuries caused when putting materials into them.

To prevent the hazards, the above risks are to be identified & eliminated.

1.3

Safety hazard not previously
identified are reported and
advice on risk control
measures is sought from the
work supervisor

Q4. Write WHS Duty of Care Checklist for Managers/Supervisors

Answers +Marking Guide (8 marks)

WHS Duty of Care Checklist for Managers/Supervisors

- Familiarise yourself with the organization [Work Health & Safety Policy 2016](#) and [Work Health and Safety Procedures](#) to ensure you are aware of your personal responsibility for workplace health and safety (WHS) within your area of delegated authority.
- Ensure that the work for which you are responsible is carried out in accordance with the University's [WHS risk management steps](#) to safeguard the health, safety and wellbeing of those involved and others who may be affected.
- Demonstrate active and visible leadership in WHS risk management. Identify hazards or WHS risks associated with different jobs, tasks and projects and assess the risks to the health and safety of those involved. Conduct this risk identification and assessment in consultation with those involved or affected.

- Implement suitable risk controls within agreed timeframes. These may include competency based training, adequate supervision and adoption of safe operating procedures. Choose these risk controls in consultation with those involved or affected.
- Inform staff, students and contractors of WHS requirements and expectations, directing them to relevant information and risk control resources available. This may include local WHS induction (refer to the [WHS induction checklist](#)), on-the-job instruction and specific WHS training.
- Promptly address WHS issues that are brought to your attention in consultation with those involved or affected.
- Refer WHS issues that are beyond your control to the relevant manager(s) for their attention, but ensure that interim action is taken to reduce the risks in a practical way.
- Investigate incidents, seeking to identify the causes and take steps to prevent recurrence.

1.4

The nature of the work is obtained from documentation and from work supervisor to establish the scope of work to be undertaken.

Organize the tools & equipments to do the following assembly task

Practical 1

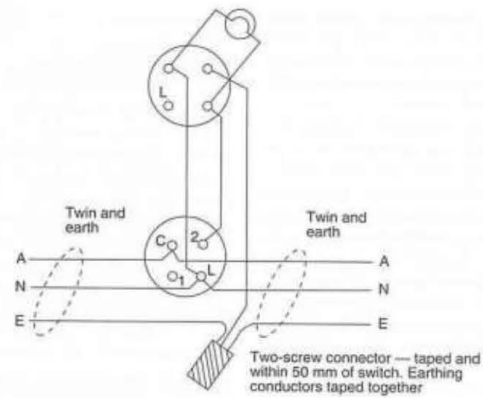
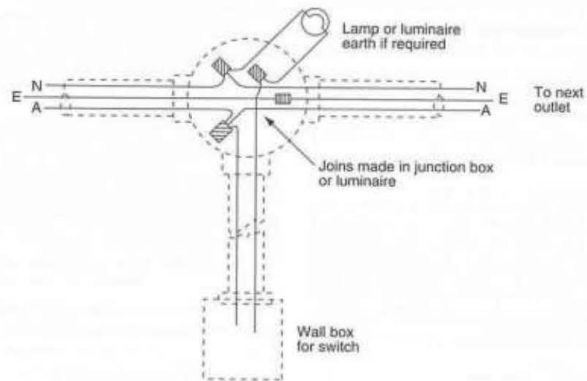


Fig. 6.8 Looping of switch using twin and earth cable



Equipments

In addition to above tools & equipments, you need to purchase & bring the following additional equipments & wiring accessories.

Students performance in the practical is assessed.

1.5 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.

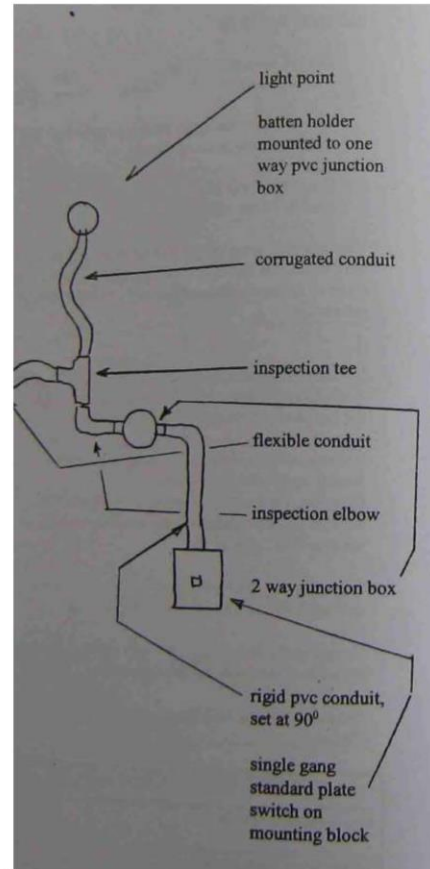
Students co-operation in the practical is evaluated.

1.6 Materials required for the work are obtained in accordance with established routines and procedures.

List the tools & materials to perform the following assembly task.

Practical (5) Conduit wiring circuit on timber board

You have to do the following wiring. Wiring to be done as enclosed wiring in conduit



Version | Stage 1 Electrical Workshop Practicals for Advanced Diploma Classes

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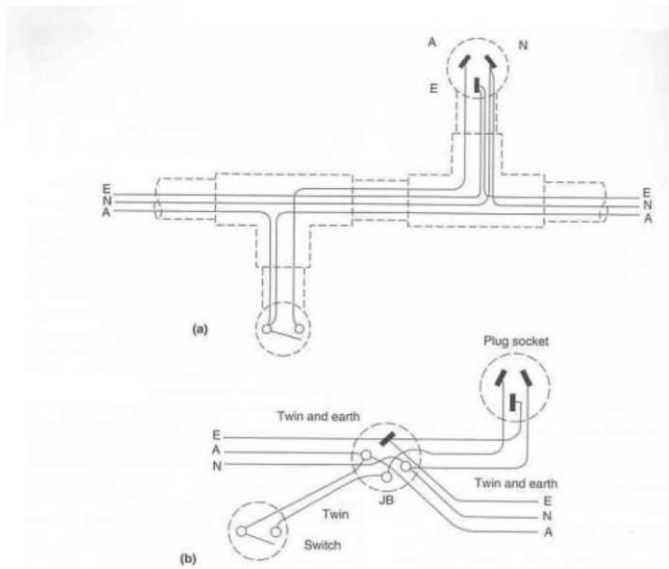
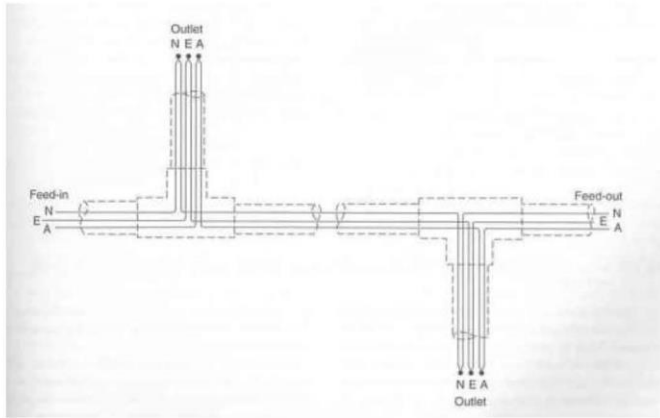
1.7

Tools, equipment and measuring devices needed to carry out the work are obtained and checked for correct operation and safety.

List the tools & materials to perform the following assembly task.

Practical (6) Wiring circuit for socket outlet on timber board

Do the following circuits on timber board



UEENEEG106A

- 1.4 The junction box/ terminal enclosures and terminal types are inspected to select the type and size of cable and conductor termination devices needed.

Activity

Select the appropriate junction to make the connection

UEENEEG106A

- 1.5 Tools, materials and testing devices needed to for terminating cables and cords are obtained in accordance with established procedures and checked for correct operation and safety.

As per 1.7

2.Lay wiring/cabling and connect accessories for extra-low voltage circuits.

- 2.1 Established OHS risk control measures and procedures for carrying out the work are followed.

As per 1.1, 1.2 & 1.3

2.2

Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.

Practical tasks 2

You are required to energize the wiring circuit that you have already done on the work board given in the picture. Demonstrate the followings

- Isolating the supply
- Checking the circuit
- Checking the machine
- Marking the original assembly.
- Use of hand tools
- Dismantle and keep the components systematically.
- Reassembly.
- Safety Checking

2.3

Wiring and accessories are installed to comply standards and job specifications with sufficient excess to affect terminations.

2.3 G106

Cable/cord ends are cut and sheath/insulation stripped with sufficient length to prevent stain on terminations and without undue waste.

Observation

Observed students performance in

- Cutting the wire
- Cable termination
- Installing the components
- Wire up
- Checking the polarity & continuity
- Compliance with AS3000 standard

2.4

Accessories are installed straight and square in the required locations and within acceptable tolerances.

2.4 G106

Cable glands/retaining devices are fitted and secured to ensure cable/cord cannot be pulled out of entry into junction box/ terminal enclosure

Observation

- Simplification of wire lines
- Systematic arrangement of components
- Neat & accurate workmanship are to be evaluated.

2.5

Cables and conductors are terminated at accessories in accordance with manufacture's specifications and regulatory requirements.

2.5 G106

Conductors are prepared to suit the type of terminal at which there are to be connected

Observation

- Cutting the wire
- Cable termination
- Installing the components
- Wire up
- Checking the polarity & continuity
- Compliance with AS3000 standard

2.6

Cables installed for future service and marked in accordance with the cable identification scheme and terminated in compliance with regulatory requirements.

2.6 G106

Conductors are terminated to ensure continuity across the terminal.

Observation

- How to allocate the cable for future expansion is observed.

2.7

Procedures for referring non-routine events to

immediate supervisor for directions are followed.

Observation

During the practical, emergency evacuation order or lock down order may be coming. In this case students will need to calmly step the works and follow the instruction . But they might put tools and components somewhere around and when they come back, they may not remember where they put them. In this case the students are to be instructed the step they reached before emergency situation and systematically place the tools and equipments before evacuation. Their interaction to such an simulated event is observed and evaluated.

2.8 Cable installation and termination is carried out efficiently without waste of materials or damage to apparatus, circuits or the surrounding environment and using sustainable energy practices.

Observation

Checking the fabricated assembly is to be done to ensure the followings

- Proper alignment
- Proper fit
- Meet the required dimension
- No damage
- No over use of materials

3.Complete and report work activities.

3.1 Established OHS risk control measures and procedures for carrying out the work are followed.

As per 1.1, 1.2, 1.3

3.2 Work site is cleaned and made safe in accordance with established procedures.

Observation

- House keeping procedure in
- Returning the tools and equipments
- Cleaning the work place are to be assessed

3.3 Work supervisor is notified of the completion of the work in accordance with established procedures.

3.2 G106 Terminated cables are tested to ensure continuity

Observation

- Students report to completion
- Checking of their job
- Signing off in supervisor record are to be done.

EKAS Assessment

Refer Question & Marking Scheme for Tests

ASSESSMENT SCHEDULE

E101+E102+E105+E108 +G106 are concurrently assessed.

Performance Criteria	Assessment 1 Practical		Assessment 2 Theory
	Continuous Observation	Written Assessment as part of Practical	Written Assessment

1.1		X	X
1.2		X	X
1.3		X	
1.4	X		
1.5	X		
1.6	X		
1.7	X		
2.1	X		
2.2	X		
2.3	X		
2.4	X		
2.5	X		
2.6	X		
2.7	X		
2.8	X		
2.9	X		
3.1			X
3.2	X		
3.3	X		
EKAS Assessment		X	X

Location of Evidences (Table 1)

Performance Criteria	Above	Location of Evidences
Marking Guide/ Assessment Cover/		

Feedback own record		
Students' work in own record	Summative Assessment- Formal Tests	
	Formative Assessment/Practical+ Class works	
Marking Guide to be presented for audit		
Students' work to be presented for audit		

ELECTRICAL TRADES REFERENCES

<https://www.iqytechnicalcollege.com/electricaltrade2022.htm>

Assessment Mapping - Template

(streamlined training package)

This template to be used for “new” endorsed streamlined training packages.

Instruction for use: These instructions in RED should be deleted from the completed document. Instructions in BLUE should be written over with appropriate information.

- This template is to be completed by the assessment developer to ensure the assessments meet the training package requirements for the unit of competency.
- It must be used during the assessment validation process.
- Record of this document must be retained in the faculty TAS teamshare teaching section.
- Add rows and columns as required below.

This document should be viewed concurrently with [K151A Assessment Mapping+Performance .pdf](#)

Click [HERE](#)

Faculty:		College:	
Teaching Section:	Electrical Engineering		
Qualification Number and Name:	Advanced Diploma of Engineering Technology-Electrical/ Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEERE0066 - Develop effective engineering strategies for energy reduction in buildings		

Copy and paste the following table for each element as required

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
1.Prepare to develop strategies for effective energy reduction in buildings	1.1	OHS procedures for a given work area are identified, obtained and understood	Q1 of K151A Assessment Mapping+ Performance .pdf (Page 1)		
	1.2	Established OHS risk control measures and procedures are followed in preparation for the work	Q2 of K151A Assessment Mapping+ Performance .pdf (Page 1)		
	1.3	The extent of evaluation is determined from specifications of building(s) and services, plant and machinery and discussed with appropriate personnel	Q1 ,2, 5 of Test 1		
	1.4	Advice is sought from the work supervisor to ensure the work is coordinated effectively with others		Observation Assessment Mapping+ Performance .pdf (Page 2)	
	1.5	Tools, testing devices, and materials needed to carryout the work are obtained and checked for correct operation and safety	Q3, 4 of Test 1		
2 Develop strategies for effective energy reduction in buildings.	2.1	OHS risk control measures and procedures for carrying out the work are followed	Q2 of K151A Assessment Mapping+ Performance .pdf (Page 3)		
	2.2	Tests and measurements are carried out in strict accordance with OHS requirements safety procedures	Q6, 8 of Test 2		
	2.3	In-depth knowledge of the energy use of building services, plant and machinery is applied to the	Q1a of Test 2	Practical (1) Measure energy	Advanced Diploma in Electrical

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
		evaluation process		usage in the building .	Engineering Exercises (Page 271/272) Q1 to 27
	2.4	Energy evaluation tests are set up in accordance with established test methods and procedures for each particular parameter under scrutiny	Q3,4 of Test 2		Advanced Diploma in Electrical Engineering Exercises (Page 271/272) Q62 to 72
	2.5	Strategies to reduce energy use with compromising occupancy standards are developed from knowledge of energy management and evaluation			Advanced Diploma in Electrical Engineering Exercises (Page 271/272) Q84 to 102
	2.6	Unexpected situations are dealt with safely and with the approval of an authorised person		Q4 of K151A Assessment Mapping+ Performance .pdf (Page 10)	
	2.7	Evaluation is carried out without damage to systems, circuits, the surrounding environment or services and using sustainable energy practice		Observation – Practical 2 Solar panel installation practical	
3 Document and report strategies for effective energy reduction in buildings	3.1	OHS work completion risk control measures and procedures are followed	As per 1.1 & 1.2		
	3.2	Work site is cleaned and made safe in accordance with established procedures		Observation – Housekeeping Activity	
	3.3	Results of energy use evaluation and recommended strategies			Advanced Diploma

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
		and their criterion for energy reduction are documented in accordance with established procedures			in Electrical Engineering Exercises (Page 271/272) Q103 to 115
	3.4	Energy reduction report is forwarded to appropriate persons		Practical 3-Preparing energy reduction plan report	

Add rows to the following table as required

Performance Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Risk assessment in installing solar panel on rooftop	Q1,2 of K151A Assessment Mapping+ Performance .pdf (Page 1)		
Passive solar design, Assessing comfort conditions			Advanced Diploma in Electrical Engineering Exercises (Page 271/272) Q1 to 27
Ventilation system design & application of psychrometric chart, Determination of energy usage			Advanced Diploma in Electrical Engineering Exercises (Page 271/272) Q62 to 72
Measure energy usage in the building		Practical 1	
Solar panel installation		Practical 2	

Performance Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Design for climate, Determining Solar effect & wind condition.			Advanced Diploma in Electrical Engineering Exercises (Page 271/272) Q84 to 102
Matching solar panel to load		Q4 of K151A Assessment Mapping+ Performance .pdf (Page 10)	
Energy use evaluation and recommended strategies			Advanced Diploma in Electrical Engineering Exercises (Page 271/272) Q103 to 115
Energy reduction report preparation		Practical 3	

Add rows to the following table as required

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T1 Climate and thermal comfort	Test 2 Q6		
T2 Solar geometry and radiation	Test 1 Q2		
T3 Heat transfer	Test 1 Q1 & Q6		
T4 Glazing Systems	Test 1 Q2		
T5 Insulation	Test 1 Q1 & Q5		
T6 Thermal mass	Test 1 Q1 & Q7		
T7 Comfort control strategies	Test 2 Q1a, Q6,Q7		

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T8 Energy efficiency in buildings + T11 Energy rating schemes			Advanced Diploma in Electrical Engineering Exercises (Page 271/272) Q103 to 115
T10 Integration of active solar system			Advanced Diploma in Electrical Engineering Exercises (Page 271/272) Q84 to 102
T12 Sustainable and safe building materials			Advanced Diploma in Electrical Engineering Exercises (Page 271/272) Q56 to 67

Assessment Conditions	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the welectrical workshop K2.11. Application of safe working practice & regarding the housekeeping rules are to be observed. Emergency procedures are to be informed. Safety equipments & first aids equipments are to be available. The students get the access to <ul style="list-style-type: none"> • Relevant practical equipments • Records relating to electrical engineering resources 	Test 1+2	Practical 1,2,3	All assignments

Created by (Name)	U Kyaw Naing (Joe)	Date created	
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Approved by (Name)		Date approved	
Signature		Date modified	

UEENEEK151A

Develop effective engineering strategies for energy reduction in buildings

ASSESSMENT QUESTIONS & TESTS ARE BASED ON THE FOLLOWINGS, THEY ARE MODIFIED, EXTRACTED SOME PARTS, APPLIED THE SIMILAR ONES, ALTER AND UTILIZED IN ASSESSMENT TASKS & THEORY TESTS FROM TIME TO TIME.

1 Prepare to develop strategies for effective energy reduction in buildings

1.1 OHS procedures for a given work area are identified, obtained and understood

Q1. To install the solar panel on the roof top, outline the OHS aspects to be concerned.

Marking Guide+Question (4 marks)

- Precaution regarding working at height
- Precaution against electrocution due to panel terminal
- Precaution on insulation & heat resistance to protect heating
- Ensure the strength of roof trusses to withstand the weight of equipments and workmen.

1.2 Established OHS risk control measures and procedures are followed in preparation for the work

Q2. List the risk level associated with the tasks in the following table from 1 to 6. 1=The most serious, 6=least serious

Injury caused by falling down from the height	
Electrical fire caused by overheating of solar panels	
No matching of solar panel and inverter	
Electrical interruption when sun set due to lack of battery.	
Equipments damage due to electrical surge	
Appearance of solar panel	

Marking Guide+Question (6 marks)

Injury caused by falling down from the height	1
Electrical fire caused by overheating of solar panels	2
No matching of solar panel and inverter	4
Electrical interruption when sun set due to lack of battery.	6
Equipments damage due to electrical surge	3
Appearance of solar panel	5

1.3 The extent of evaluation is determined from specifications of building(s) and services, plant and machinery and discussed with appropriate personnel

Test 1 Question

Q1+Q2+Q5

1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others

Observation (10 marks)

The practical tasks will be performed by 2 teams

Duties of team 1

Determine total electrical usage by all electrical equipments in a home

Duties of team 2

Estimate the appropriate size of solar panel to meet the electrical usage

The co-ordination between two teams will be assessed.

1.5 Tools, testing devices, and materials needed to carryout the work are obtained and checked for correct operation and safety

Test 1 Q3+4

Location of Evidences (Table 1)

Performnce Criteria	Above	Location of Evidences
Marking Guide/ Assessment Cover/ Feedback own record		
		Assessment Feedback Sheet

Students' work in own record	Summative Assessment- Formal Tests	
	Formative Assessment/Practical+ Class works	
Marking Guide to be presented for audit		
Students' work to be presented for audit		

2 Develop strategies for effective energy reduction in buildings.

2.1 OHS risk control measures and procedures for carrying out the work are followed

Q3. Match the OHS risk & control activities

Injury caused by falling down from the height	Matching solar panel rating & inverter rating
Electrical fire caused by overheating of solar panels	Fall prevention system is utilized
No matching of solar panel and inverter	Design & arrangement according to plan
Electrical interruption when sun set due to lack of battery.	Installation of back up battery
Equipments damage due to electrical surge	Use of insulators under solar panel & proper air ventilation
Appearance of solar panel	Surge protector is applied

Marking Guide+Question (6 marks)

Injury caused by falling down from the height	Fall prevention system is utilized
Electrical fire caused by overheating of solar panels	Use of insulators under solar panel & proper air ventilation
No matching of solar panel and inverter	Matching solar panel rating & inverter rating
Electrical interruption when sun set due to lack of battery.	Installation of back up battery
Equipments damage due to electrical surge	Surge protector is applied
Appearance of solar panel	Design & arrangement according to plan

2.2 Tests and measurements are carried out in strict accordance with OHS requirements safety procedures

Test 2 Question 6+8

Advanced Diploma in Electrical Engineering Exercises (Page 273)

(3) Solar calculation , thermodynamic principle

Slide 1

Q35.Sketch solar irradiation diagram

Slide 2

Q36.Write the equation to calculate solar irradiation.

2.3 In-depth knowledge of the energy use of building services, plant and machinery is applied to the evaluation process

Test 2 Question 1a

Advanced Diploma in Electrical Engineering Exercises (Page 271/272)

(1) Passive solar design

Q1.What is a active solar system?

Q2.What are micro-climates in Australia?

Slide 2+8

Q3.What is passive solar system design?

Slide 3

Q4.What is thermal mass?

Q5.What are the features of hot humid climate?

Slide 4

Q6. Sketch the building glassing system & how it effects the heating in building?

Slide 5

Q7. Sketch the overview & layout of a building for wind and direct entry

Q8. Sketch direct and indirect sun gain system

Slide 6

Q9. Sketch solar collector.

Slide 7

Q10. Sketch (a) Air based solar system (b) Water based solar system.

Slide 9+10+11

Q11. What are the factors affecting comfort?

Slide 12+13+14

Q12. Explain psychometric chart.

Slide 15

Q13. Explain (a) Humidity (b) Relative humidity (c) wet bulb temperature (d) Dew point temperature

Slide 16+17

Q14. Sketch the construction of air conditioning system for commercial building

Slide 18+20

272

Q15. Explain the methods for measuring air movement and balancing

Slide 19

Q16. Describe basic building construction with sketches.

(2) climate and human comfort

Slide 1

Q17. What is comfort?

Slide 2

Q18. Write the equation to calculate heating degree day.

Q19. Sketch wind and flow diagram of world

Slide 3+4

Q20. Describe the feature of (a) Hot arid zone (b) Temperate zone

Slide 5+6

Q21. How does heat produced in human's body?

Slide 7+8

Q22. What change is required to make the comfort when relative humidity is too high?

Slide 9

Q23.What is shading coefficient?

Slide 10+11

Q24.Sketch incidence & reflected ray diagram.

Slide 11

Q25.Write the equation for environmental temperature & dry resultant temperature.

Slide 12+13

Q26.Write the equation for thermal neutrality.

Slide 14.

Q27.Write the heat gain values for various types of activities.

2.4 Energy evaluation tests are set up in accordance with established test methods and procedures for each particular parameter under scrutiny

Advanced Diploma in Electrical Engineering Exercises (Page 277/278)

Test 2 Question ¾

(6) Ventilation, application of psychrometric chart

Slide 1

Q62.Explain ventilation

Slide 2+3+4+5+6

Q63.Describe air velocity and air volume

Q64.What are the systems of ventilation ? sketch the diagrams.

Slide 7+8

Q65.Sketch air ventilation system for multi storey building.

Slide 9

Q66.Describe the application of psychrometric chart.

Slide 10+11+13+14

Q67.In winter, air at dry bulb temperature of 66°C & 70% RH enters the building through a heating battery. It is heated to dry bulb temperature of 25°C without adding moisture from psychrometric chart. Find

(a) Wet bulb temperature of incoming air

(b) Relative humidity of heated air.

Q68.In Summer, air at dry bulb temperature of 27°C and wet bulb temperature 20°C enters the building through a cooling coil. It is cooled to dry bulb temperature of 19°C

Find

(a) Relative humidity of incoming air

277

(b) Relative humidity of supply air after cooling.

Q69. The air in a room has a dry bulb temperature of 23°C. Find (a) The relative humidity of air (b)

The temperature of walls when condensation occurs.

Q70. Air enters the plant at a dry bulb temperature of 24°C and 80% RH & is required to be cooled to dry bulb temperature of 19°C & 60% RH. Find (a) the temperature of air in washer (b) the reduction in moisture content of supply air.

Slide 16+17+18+19+20

Q71. (a) Calculate heat gain per day from the customers in a 200 m² gym, If the gym capacity is 60 customers and the gym is full between 6 am to 8 am and 5 pm to 8:30 pm. At all other times, it is 30% full on average.

(b) Calculate heating contributions from all the appliances in a communal house containing 8 people. The house has one electric hot water system for two bath rooms, 6 bed rooms and one all electric kitchen. One TV, seven music systems, two computers and twenty lights. Assume that the house uses 32 kWh per day and the hot water is 45% of the load. The cooker consumes 20% of the load and 20% of heat generated by cooker is vented outside by the range hood.

(c) In above (b) would it make any difference if the water heater was located outside the building?

(d) What would be the heat gain per month if the cooker in (b) uses bottle gas (Gas is 45MJ/Kg and the house uses 0.5 kg/ day)?

(e) The table below lists the power consumption of the appliances used in the house and the hours per day for which they are used. Calculate heat gain from appliances per month.

Appliance Power (watt) Daily usage per appliance (hr)

TV 50 15

Music system 45 3

Computer 100 13

Printer 20 1

Lights 80 2

(7) Thermal mass, centralised air conditioner, cooling load

Slide 1

278

Q72. What are the materials that can be used as thermal mass . Explain the installation method of them.

2.5 Strategies to reduce energy use with compromising occupancy standards are developed from knowledge of energy management and evaluation

Advanced Diploma in Electrical Engineering Exercises (Page 279/280)

Activity

Measure energy usage in the building .

After having applied the energy saving process, compare the energy usage and submit the report.

Test 2 Q 1b

(10) Building service energy management

Slide 1

Q84.Explain building service energy management system.

Slide 2

Q85.Write electricity & oil gas energy unit calculation formula

Slide 3+4

Q86.Compare building load sources

Q87.Express factors influencing room load.

Q88.What are fresh air requirements for various types working spaces.

Slide 5

Q89.Sketch fresh air supply system.

Slide 6

Q90.What are the factors affecting building energy

Slide 7 to 15

Q91.Sketch building water supply system and pipe fitting

Slide 10+11

Q92.Sketch hot water system.

(11) Design for climate

Slide 1 to 4

Q93.What are the principles of design for climate?

Slide 5+6

Q94.Explain how to achieve thermal comfort inside building.

280

(12) Air movement

Slide 1

Q95.Explain air movement to get comfort.

Slide 2

Q96.What is evaporative cooling?

Slide 3

Q97.What are the ways of designing the building for Australian climate?

(13) Solar effect & wind condition.

Slide 1

Q98.Explain the features of temperate climate & typical home construction method.

Slide 2

Q99.Explain hot arid climate & home construction method.

Slide 3

Q100.Explain hot humid climate & home construction method.

Slide 4

Q101.Sketch diagram for home to access the wind.

Slide 5

Q102.Write the equation to calculate ventilation.

2.6 Unexpected situations are dealt with safely and with the approval of an authorised person

Q4. If the voltage rating of available solar panel can not exactly match the required voltage level, what will you do?

Marking Guide+Question (2 marks)

Connect series/ parallel to get the most appropriate voltage.

Determine appropriate inverter & step up step down transformer.

2.7 Evaluation is carried out without damage to systems, circuits, the surrounding environment or services and using sustainable energy practice

Observation

- Observe students fabrication of solar panel design & connection

www.highlightcomputer.com/electricaldiploma2018.htm

Work performance + Practical Instruction Back up

Click [HERE](#) to download practicals

- Refer Solar & Renewable Energy Practicals

Location of Evidences (Table 1)

3 Document and report strategies for effective energy reduction in buildings

3.1 OHS work completion risk control measures and procedures are followed

As per 1.1 & 1.2

3.2 Work site is cleaned and made safe in accordance with established procedures

Observation

Students activity in house keeping after the practical task is observed & evaluated.

3.3 Results of energy use evaluation and recommended strategies and their criterion for energy reduction are documented in accordance with established procedures

Advanced Diploma in Electrical Engineering Exercises (Page 280)

After having applied the energy saving process, compare the energy usage and prepare the comparison chart

14) HVAC

Slide 1

Q103.What are the housekeeping check lists for HVAC system?

Slide 2+3

Q104.Explain the energy efficient operation of air-conditioning system.

Slide 4 to 8

Q105.Execute the building survey activities as described in slide 4+5

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Q106.What are the building survey procedures for domestic and commercial buildings?

(15) Solar hot water system

Slide 1+2

Q107.Sketch solar hot water system.

Slide 3

Q108.Sketch the construction and connection of solar absorber plates

Slide 4

Q109.Describe (a) Collector surface coating (b) Heat transfer medium (c) Insulation (d) Capacity of storage tank (e) Hot water temperature of solar hot water system.

Slide 5

Q110.Sketch connection of collector and storage tank.

Slide 6

Q111.Sketch the hydraulic circuit of solar water.

Slide 7

Q112.Sketch the electrical circuit for solar water heating system.

Slide 8+9

Q113.Describe installation , orientation & sizing of solar collector system.

Slide 10

Q114.Sketch solar assisted heat pump.

Slide 11

Q115.Explain lighting management for commercial building

3.4 Energy reduction report is forwarded to appropriate persons

Observation

After having applied the energy saving process, compare the energy usage and prepare the comparison chart to be included in the report Presentation & assessment.

The students will need to provide the conclusion on the idea regarding the further energy reduction plan. The conclusion is assessed.

EKAS	Delivery & assessment System
<p>KS01-EK151A Energy efficient building design</p> <p>Evidence shall show an understanding of energy efficient building design to an extent indicated by the following aspects:</p> <p>T1 Climate and thermal comfort encompassing:</p> <ul style="list-style-type: none">☑ characteristics of the different Australian climatic types.☑ use of climatic data in published and electronic forms to extract the quantities relevant to energy efficient design.☑ relationship between climate and comfort using bioclimatic or psychrometric charts.☑ calculation of heating or cooling degree days or degree hours for various locations.☑ calculation of thermal neutrality for a given	<p>Record2016/Students/TAFE/Sem 1-2016/Sem1</p> <p>2016 Students work Assessment 1/K151</p> <p>Assessment 2 /Question Marking scheme</p> <p>Building Design+Material Science-K041+E047.zip</p> <p>Energy Efficient Building Design</p> <p>K041 Lesson 1-Solar Design.zip</p> <p>http://youtu.be/KF3jT7Wm60I</p> <p>K041 Lesson 2-Basic psychrometric chart.zip</p> <p>http://youtu.be/iVU9d2OrN_c</p> <p>K041 Lesson 3-Total heat resistance.zip</p>

location.

T2 Solar geometry and radiation encompassing:

- ☑ definition of the terms: declination, hour angle, zenith angle, azimuth and altitude angles, the equation of time.
- ☑ conversion of solar time to local time and vice versa.
- ☑ position of the sun and the length of shadows with the aid of algorithms, tables, sun charts or computer software.
- ☑ daily irradiation incident on a wall, window or roof of a given tilt and orientation.
- ☑ relative summer and winter irradiation of windows facing the cardinal orientations.

T3 Heat transfer encompassing:

- ☑ thermal processes of conduction, convection and radiation apply to the transfer of heat in buildings.
- ☑ calculation of the summer and winter U-values of building elements using tables and software.
- ☑ calculation of the infiltration heat transfer in a building.

T4 Glazing Systems encompassing:

- ☑ different types of glazing systems and their characteristics.
 - ☑ different types of shading devices and the window orientations for which they are most appropriate.
- solar heat gain for different glazing types and

<http://youtu.be/QEC3CFN0C0A>

[K041 Lesson 4-U value Heat conductance calculation.zip](#)

<http://youtu.be/gJWiSnYVYwI>

[K041 Lesson 5-Glazing+Net Heat gain heat loss.zip](#)

<http://youtu.be/az4jFnDn4eQ>

[K041 Lesson 6-Shading.zip](#)

<http://youtu.be/srTWLtaPpgg>

[K041 Lesson 7-Insulation+ Thermal mass.zip](#)

http://youtu.be/T8D_KeXhB2Q

<http://youtu.be/Ws5H152tgEo>

[K041 Lesson 8-Thermal mass insulation.zip](#)

<http://youtu.be/R5Qv2EFjUVU>

[K041 Lesson 9-Airconditioning load calculation.zip](#)

<http://youtu.be/KrHJkNwbr0I>

<http://youtu.be/mxP4thaiS88>

[K041 Lesson 10-Heat gain per day.zip](#)

<http://youtu.be/X5B99-Q6ddU>

angles of incidence

☑ calculation of the average daily irradiation of a window partly shaded by eaves, using computer software.

☑ calculation of the average daily heat gain through a window partly shaded by eaves.

T5 Insulation encompassing:

☑ different types of insulation and where they are used.

☑ how different types of insulation are installed in roofs, walls and floors.

☑ determination of the minimum R-values of roof insulation for different locations using Australian Standard AS2627 or similar standards.

T6 Thermal mass encompassing:

☑ advantages and disadvantages of using substantial thermal mass in different climate types and for different heating and cooling regimes.

☑ where thermal mass can be located in a building.

☑ explain what is meant by the following terms: time lag, decrement factor, admittance, response factor.

T7 Comfort control strategies encompassing:

☑ interpretation of the usefulness of a design strategy with the aid of a psychrometric chart showing control

[K041 Lesson 11-Ventilation.zip](#)

<http://youtu.be/LdCEptDVMIY>

[K041 Lesson 12-Building heating load](#)

<http://youtu.be/VDHI1YbcX3c>

<http://youtu.be/FH1bPDCuLD0>

[K041 Lesson 13-Design Assessment Tools](#)

[K041 Lesson 14-Design for Australian climate.zip](#)

<http://youtu.be/6Vhv5H4Wfps>

[K041 Lesson 15-Domestic solar hot water system.zip](#)

<http://youtu.be/JCqxyzX5jHY>

http://youtu.be/j5bfWGOS_zA

[K041 Lesson 16-Energy efficiency+Lighting.zip](#)

<http://youtu.be/CVvXJj28pcg>

[K041 Lesson 17-Illumination+Smoke alarm.zip](#)

<http://youtu.be/piMwahVLYhw>

http://youtu.be/JBvzyR-_GzA

potential zones
for a particular location.

- ☑ selection of the most useful comfort control strategies for Australian climatic regions.

T8 Energy efficiency in buildings encompassing:

- ☑ determination of the direction of the following: both true and magnetic, north winter and summer sunrise, winter and summer sunset.
- ☑ solar access in summer and winter to various possible house locations on a site and room locations within the house.
- ☑ how vegetation can be used to both funnel and deflect wind.
- ☑ using cross ventilation as a cooling strategy.

T9 Thermal performance of a building encompassing:

- ☑ heating requirements of a building using the heating degree day or hour method.
- ☑ dynamic performance predicted by a computer simulation program such as NatHERS or BERS.

T10 Integration of active solar systems encompassing:

- ☑ active solar system types available which can provide hot water, space heating and cooling.
- ☑ the best location on the roof, and the optimum tilt and orientation of the collector panels.
- ☑ function of the main components of an air or

[K041 Lesson 18-Water supply.zip](#)

<http://youtu.be/-A96elUfsNU>

[K041 Lesson 19-Ventilation+Lighting control.zip](#)

<http://youtu.be/CO0ClnAFT6A>

[K041 Lesson 20-Electrical system design.zip](#)

http://youtu.be/KX7E_Nc7_54

[K041 Lesson 21-Building materials.zip](#)

<http://youtu.be/Gi77wNzXEj4>

<http://youtu.be/ZkgOHP0RESs>

<http://youtu.be/C6sxFVofvkE>

<http://youtu.be/8BcUJ7BDKII>

http://youtu.be/ap0iMZ_Z9Qs

water-based solar space heating system.

- ☒ schematic of the fluid circuit of an air or water-based space heating system.
- ☒ main solar cooling system types.

T11 Energy rating schemes encompassing:

- ☒ differences in approach used by house energy rating schemes in Australia.
- ☒ energy performance of a number of houses using a computer simulation program such as NatHERS or BERS.
- ☒ other methods to reduce energy consumption within and outside a building including appliance efficiency, human behaviour changes, building management strategies and transportation minimisation.
- ☒ additional cost of energy efficiency measures and cost savings using life cycle cost or simple pay back methods according to Aust. Standard AS3595 and AS4536.

T12 Sustainable and safe building materials encompassing:

- ☒ common building materials and their embodied energy content.
- ☒ environmental impact of the production of various building materials.
- ☒ problems associated with the use or disposal of building

materials.

Location of Evidences (Table 1)

Performance Criteria	Above	Location of Evidences
Marking Guide/ Assessment Cover/ Feedback own record		
Students' work in own record	Summative Assessment- Formal Tests	
	Formative Assessment/Practical+ Class works	
Marking Guide to be presented for audit		
Students' work to be presented for		

audit	
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ASSESSMENT SCHEDULE

Performance Criteria	Assessment 1 Practical		Assessment 2 Theory
	Continuous Observation	Written Assessment as part of Practical	Written Assessment
1.1		X	
1.2		X	
1.3		X	X
1.4	X		
1.5		X	X
2.1		X	
2.2		X	X
2.3		X	X
2.4		X	X
2.5	X	X	X
2.6	X		
2.7	X		
3.1	X	X	
3.2	X		
3.3		X	X
3.4		X	X
EKAS Assessment		X	X

Energy Efficiency References

www.highlightcomputer.com/electricaldiploma2018.htm

[Advanced Diploma in Electrical Engineering Exercises](#) Click [HERE](#)

Assessment Mapping - Template

(streamlined training package)

This template to be used for “new” endorsed streamlined training packages.

Instruction for use: These instructions in RED should be deleted from the completed document. Instructions in BLUE should be written over with appropriate information.

- This template is to be completed by the assessment developer to ensure the assessments meet the training package requirements for the unit of competency.
- It must be used during the assessment validation process.
- Record of this document must be retained in the faculty TAS teamshare teaching section.
- Add rows and columns as required below.

This document is to be viewed concurrently with C007 Attached
Click [HERE](#)

Faculty:	Construction, Engineering & Transport (CET)	College:	Ultimo
Teaching Section:	Electrical Engineering		
Qualification Number and Name:	UEE62111 Advanced Diploma of Engineering Technology-Electrical/ UEE62211 Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEECD0039 Provide solutions to basic engineering computational problems UEECD0049 Use advanced computational processes to provide solutions to energy sector engineering problems		

Copy and paste the following table for each element as required

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Report	Practical
1. Provide computational solutions to engineering problems.	1.1	OHS procedures for a given work area are identified, obtained and understood.	Concurrently assessed with UEENEEE101A/CD0007		
	1.2	Scope of problem/s is obtained from documentation and/or from work instructions to determine work	Test 3 Q 1/2/3		
	1.3	Problems are documented and/or diagrammatic form and appropriate methods identified to resolve them.	Test 1B Q7		
	1.4	Constants and variables to the problem are obtained from measured values and/or problem documentation	Test 1B Q 1/2		
	1.5	Alternative methods for resolving the problem are considered and, as required, discussed with relevant person/s		Q37 Advanced Diploma in Electrical Engineering Exercises Page 37 Method 1- Simultaneous equation method Method 2- Matrice Solution	

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Report	Practical
	1.6	Problems are resolved using mathematical processes in accordance with workplace procedures		Q117 to 120 Advanced Diploma in Electrical Engineering Exercises Page 39	
2.Complete work and document problem solving activities	2.2	Justification for solutions used to solve engineering problems is documented in work records in accordance with workplace procedures and relevant industry standards	Test 3 Q 1/2/3 Test 2B Q7 Test 2 Q6		
	2.1	Work completion is documented and relevant person/s notified in accordance with workplace procedures		All assignments submission	

Performance Evidence	Test	Assignment Report	Practical
Applying mathematics in electrical problems solving			Test 3 Q 1/2/3
Applying mathematics in mechanical problems solving	Test 2B Q7		
Applying mathematics in financial problems solving	Test 1B Q7		
Applying mathematics in electronic problems solving			Test 2 Q6

Knowledge Evidence	Test	Assignment Report	Practical
T1 Rational, irrational numbers and basic algebra	Test1B Q1/2		
T2 Algebraic manipulation	Test1B Q1/2		
T3 Laws of indices	Test 1B Q3		
T4 Estimations, errors and approximations		Q117 to 120 Advanced Diploma in Electrical Engineering Exercises Page 39	

Knowledge Evidence	Test	Assignment Report	Practical
T5 Plane figures – triangles and basic trigonometry	Test 2B Q2,5,6		
T6 Plane figures - quadrilaterals and circles		Q55 to 63 Advanced Diploma in Electrical Engineering Exercises Page 39	
T7 Graphs of Trigonometric functions	Test 2B Q8		
T8 Graphs of linear functions	Test 2B Q4,6		
T9 Simultaneous equations		Q37 Advanced Diploma in Electrical Engineering Exercises Page 37	
T10 Matrices	Test 3 Q6		
T11 Quadratic functions	Test 1B Q 1/2		
T12 Exponential and logarithmic functions	Test 1 Q 2		
T13 Vectors and Phasors	Test 3 Q6		
T14 Complex numbers	Test 3 Q1		

Add rows to the following table as required

Assessment Conditions	Insert Assessment event 1	Insert Assessment event 2	Insert Assessment event 3
. Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the workplace. Noise levels, production flow, interruptions and time variances must be typical of those experienced in the administration – general administration field of work and include access to: <ul style="list-style-type: none"> Electrical equipment and resources records relating to business resources 			

Created by (Name)

Date created

Approved by (Name)		Date approved	
Signature		Date modified	

UEECD0049 Use advanced computational processes to provide solutions to energy sector engineering problems

1 Provide solutions to engineering problems

- 1.1** Work health and safety (WHS)/occupational health and safety (OHS) processes and workplace procedures for a given work area are identified, obtained and applied
- 1.2** Scope of problems are obtained from documentation and/or work instruction to solve problems
- 1.3** Problems are documented and/or provided in diagrammatic form and appropriate methods identified to resolve them
- 1.4** Constants and variables to problems are obtained from measured values and/or problem documentation
- 1.5** Alternative methods for resolving problems are reviewed and, as required, discussed with relevant person/s
- 1.6** Problems are resolved using mathematical processes in accordance with workplace procedures

2 Complete work and documentation

- 2.1** Justification for solutions used to solve engineering problems is documented in work records in accordance with workplace procedures and relevant industry standards
- 2.2** Work completion is documented and relevant person/s notified in accordance with workplace procedures

Assessment Mapping - Template

(streamlined training package)

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- Add rows and columns as required below.

This document should be viewed concurrently with [G143A Assessment Mapping+Performance+Marking Guide.pdf](#)

Click [HERE](#)

Faculty:		College:	
Teaching Section:	Electrical Engineering		
Qualification Number and Name:	Advanced Diploma of Engineering Technology-Electrical/ Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UJEEEL0041 - Develop engineering solution for synchronous machine and control problems		

Copy and paste the following table for each element as required

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
1.Prepare to develop engineering solution for synchronous machine problems	1.1	OHS procedures for a given work area are obtained and understood through established routines and procedures	Q1+2 of G143A Assessment Mapping+Performance+ Marking Guide.pdf Page 1		
	1.2	Established OHS risk control measures and procedures	Q3+4 of G143A Assessment Mapping+Performance+ Marking Guide..pdf Page 2		
	1.3	The extent of the machine problem is obtained from documentation and from work supervisor to establish the scope of work to be undertaken.		Practical-Generator Test	
	1.4	Activities are planned to meet scheduled timelines in consultation with others involved in the work.		Observation in Practical	
	1.5	Effective strategies are formed to ensure solution development and implementation is carried out efficiently.			Advanced Diploma in Electrical Engineering Exercises Page 208) Q 11, 12
2. Develop engineering solution for synchronous machine problems.	2.1	Established OHS risk control measures and procedures for carrying out the work are followed.	As per 1.1,1.2,1.3		
	2.2	Knowledge of synchronous machine construction, operation, characteristics and applications are applied to developing	Q1 to 6 of G143A Assessment Mapping+Performance+		

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
		solutions to synchronous machine problems.	Marking Guide.pdf Page 5,6		
	2.3	Parameters, specifications and performance requirements in relation to each machine problem are obtained in accordance with established procedures	As above		
	2.4	Approaches to resolving synchronous machine problems are analysed to provide most effective solutions.	As above		
	2.5	Unplanned events are dealt with safely and effectively consistent with regulatory requirements and enterprise policy.	As above		
3 Test, document and implement engineering solution for synchronous machine problem.	3.1	Solutions to machine problems are tested to determine their effectiveness and modified where necessary.	Q 1 to 6 of Test 3		
	3.2	Adopted solutions are documented including instruction for their implementation that incorporates risk control measure to be followed	Q 1 to 6 of Test 3		
	3.3	Appropriately competent and qualified person(s) required to implement solutions to synchronous machine problems are coordinated in accordance with regulatory requirements and enterprise policy	Q 1 to 6 of Test 3		
	3.4	Justification for solutions used to solve synchronous machine problems is documented for inclusion in work/project development records in accordance with professional	Q 1 to 6 of Test 3		

Add rows to the following table as required

Performance Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Testing generator		Practical	
Measuring Synchronous impedance		Practical	

Performance Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Investigating the relation between frequency and voltage generated.		Practical	

Add rows to the following table as required

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T1 a.c. generators – construction, types and cooling	Advanced Diploma in Electrical Engineering Exercises Page 131) Q 64 to 67		
T2 a.c. generators – operating principles and characteristics	Advanced Diploma in Electrical Engineering Exercises Page 131) Q 68 to 70		
T3 Synchronising a.c. generators			Advanced Diploma in Electrical Engineering Exercises Page 131) Q 79 to 87

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T4 a.c. generators power, torque and efficiency	Advanced Diploma in Electrical Engineering Exercises Page 131) Q 70		
T5 Voltage regulation (AVR)			Advanced Diploma in Electrical Engineering Exercises Page 131) Q 77 to 84
T6 a.c. generator operational stability			Advanced Diploma in Electrical Engineering Exercises Page 131) Q 82 to 85
T7 a.c. generator protection			Advanced Diploma in Electrical Engineering Exercises Page 128) Q 57 , 58
T8 Induction generator			Advanced Diploma in Electrical Engineering Exercises Page 166) Q 64

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T9 Three phase synchronous motors			Advanced Diploma in Electrical Engineering Exercises Page 167) Q 72 to 76

Add rows to the following table as required

Assessment Conditions	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the welectrical workshop K2.11. Application of safe working practice & regarding the housekeeping rules are to be observed. Emergency procedures are to be informed. Safety equipments & first aids equipments are to be available. The students get the access to <ul style="list-style-type: none"> Relevant practical equipments Records relating to electrical engineering resources 	Test 1, 2, 3	Practical	All assignments

Created by (Name)	U Kyaw Naing (Joe)	Date created	
Approved by (Name)		Date approved	
Signature		Date modified	

UEENEEG143A Develop engineering solution for synchronous machine











UNIT CAPSTONE ASSESSMENT

ASSESSMENT QUESTIONS & TESTS ARE BASED ON THE FOLLOWINGS, THEY ARE MODIFIED, EXTRACTED SOME PARTS, APPLIED THE SIMILAR ONES, ALTER AND UTILIZED IN ASSESSMENT TASKS & THEORY TESTS FROM TIME TO TIME.

1 1 Prepare to develop engineering solution for synchronous machine problems

- 1.1 OHS procedures for a given work area are obtained and understood through established routines and procedures.

Q1. Identify safety equipments & signs to be used when you are using fitting & machining

<p>FIRE</p>  <p>BRAND</p>		<p>SL MSF1 - LOCATION OF FIRE FIGHTING EQUIPMENT SL MSF2 - FIRE EXTINGUISHER SL MSF3 - FIRE HOSE SL MSF4 - FIRE HYDRANT SL MSF5 - FIRE ALARM SL MSF6 - SPRINKLER STOP VALVE</p>
<p>MANDATORY</p>  <p>VERPLIGTEND</p>		<p>SL MSM1 - EYE PROTECTION SHALL BE WORN SL MSM2 - RESPIRATORY PROTECTION SHALL BE WORN SL MSM3 - HEAD PROTECTION SHALL BE WORN SL MSM4 - HEARING PROTECTION SHALL BE WORN SL MSM5 - HAND PROTECTION SHALL BE WORN SL MSM6 - FOOT AND LEG PROTECTION AGAINST LIQUIDS SHALL BE WORN SL MSM7 - FOOT PROTECTION AGAINST CRUSHING SHALL BE WORN SL MSM8 - FLAME SAFETY LAMP SHALL BE USED SL MSM9 - APRON SHALL BE WORN SL MSM10 - ACE PROTECTION SHALL BE WORN SL MSM11 - AIR-SUPPLIED HOOD SHALL BE WORN SL MSM12 - DUST MASK SHALL BE WORN SL MSM13 - AIR EXTRACTION SHALL BE WORN SL MSM14 - WASTE BINS SHALL BE USED SL MSM15 - FULL BODY WEAR SHALL BE WORN SL MSM16 - SAFETY HARNESS SHALL BE USED</p>
<p>INFORMATION</p>  <p>INLIGTING</p>		<p>SL MSG1 - FIRST AID EQUIPMENT SL MSG2 - GENERAL DIRECTION SL MSG3 - DIRECTION TO ESCAPE ROUTE SL MSG4 - DIRECTION TO ESCAPE ROUTE SL MSG5 - MANNED FIRST-AID STATION SL MSG6 - DRINKING WATER SL MSG7 - BLASTING POINT SL MSG8 - TRAVELING WAY SL MSG9 - LOCOMOTIVE REFUELLING POINT SL MSG10 - LATRINE FOR MALE EMPLOYEES SL MSG11 - REFUGE CHAMBER SL MSG12 - TELEPHONE SL MSG13 - WAITING PLACE SL MSG14 - EMERGENCY TELEPHONE SL MSG15 - ELECTRICAL ISOLATOR</p>
<p>PROHIBITORY</p>  <p>VERBODE</p>		<p>SL MSP1 - SMOKING PROHIBITED SL MSP2 - FIRE AND OPEN FLAMES PROHIBITED SL MSP3 - THOROUGHFARE FOR PEDESTRIANS PROHIBITED SL MSP4 - WATER AS EXTINGUISHER PROHIBITED SL MSP5 - DRINKING OF THIS WATER PROHIBITED SL MSP6 - PROCEEDING BEYOND THIS SIGN PROHIBITED SL MSP7 - CYCLING PROHIBITED SL MSP8 - CARRYING OF LONG MATERIAL / OBJECTS PROHIBITED SL MSP9 - HAND TRAMMING PROHIBITED SL MSP10 - LOCOMOTIVES PROHIBITED BEYOND THIS POINT SL MSP11 - USE OF COMPRESSED AIR PROHIBITED SL MSP12 - LOOSE CLOTHING, TIES, JEWELLERY AND UNCONFINED LONG HAIR PROHIBITED</p>
<p>WARNING</p>  <p>WAARSKUWING</p>		<p>SL MSW1 - GENERAL WARNING OF DANGER SL MSW2 - WARNING OF FIRE HAZARD SL MSW3 - WARNING OF EXPLOSION HAZARD SL MSW4 - WARNING OF CORROSION HAZARD SL MSW5 - WARNING OF POISONING SUBSTANCES HAZARD SL MSW6 - WARNING OF IONISING RADIATION HAZARD SL MSW7 - WARNING OF ELECTRICAL SHOCK HAZARD SL MSW8 - WARNING OF SUSPENDED LOADS HAZARD SL MSW9 - WARNING OF METHANE HAZARD SL MSW10 - WARNING OF FRAGILE ROOF SL MSW11 - WARNING OF BIOLOGICAL HAZARD SL MSW12 - WARNING OF LASER SL MSW13 - WARNING OF FALLING OBJECTS HAZARD</p>

process.

[Answers +Marking Guide \(2 marks\)](#)

Safety glass

Safety glove

Safety shoe

Ear protection

First aids sign

Q2 Write the safety procedure to operate the drilling machine

[Answers +Marking Guide \(5 marks\)](#)

PRE-OPERATIONAL SAFETY CHECKS

1. Check workspace and walkways to ensure no slip-hazards are present.
2. Check that the drill chuck guard is in position.
3. Ensure the chuck key (if used) has been removed from the drill chuck.
4. Locate and ensure you are familiar with the operation of the ON/OFF starter and E-Stop (if fitted).
5. Follow correct clamping procedures to ensure work is secure.
6. If the job obstructs the walkway erect a barricade.
7. Adjust spindle speed to suit drill or cutter diameter.
8. Faulty equipment must not be used. Immediately report suspect equipment.

OPERATIONAL SAFETY CHECKS

1. Never leave the Drill Press while it is running.
2. Before making adjustments or before cleaning swarf accumulations switch off and bring the machine to a complete standstill.
3. Feed downwards at a sufficient rate to keep the drill cutting.
4. Feed with care as the drill breaks through the underside of the work.
5. Use a safe working posture (beware of hair catching).

HOUSEKEEPING

1. Switch off the machine.
2. Leave the machine in a safe, clean and tidy state.

POTENTIAL HAZARDS

- Hair/clothing entanglement - rotating spindle/drill
- Eye injuries
- Flying swarf/chips
- Sharp edges & burrs

1.2

Established OHS risk control
measures and procedures

Q3 What are the main source of hazards to use the drilling machine?

[Answers +Marking Guide \(5 marks\)](#)

(1) Hazards related to the machinery or plant, materials or items being processed or internal sources of energy, for example:

- drawing in or trapping hazards;
- entanglement hazards;

- shearing hazards;
- cutting hazards;
- impact hazards;

(2) hazards related to the location of the machine or plant, for example:

- its stability, for instance, whether it could roll or fall over;

(3) hazards related to systems of work associated with the machine or plant, for example manual handling injuries caused when putting materials into them.

To prevent the hazards, the above risks are to be identified & eliminated.

Q4. Write WHS Duty of Care Checklist for Managers/Supervisors

[Answers +Marking Guide \(8 marks\)](#)

WHS Duty of Care Checklist for Managers/Supervisors

- Familiarise yourself with the organization [Work Health & Safety Policy 2016](#) and [Work Health and Safety Procedures](#) to ensure you are aware of your personal responsibility for workplace health and safety (WHS) within your area of delegated authority.
- Ensure that the work for which you are responsible is carried out in accordance with the University's [WHS risk management steps](#) to safeguard the health, safety and wellbeing of those involved and others who may be affected.
- Demonstrate active and visible leadership in WHS risk management. Identify hazards or WHS risks associated with different jobs, tasks and projects and assess the risks to the health and safety of those involved. Conduct this risk identification and assessment in consultation with those involved or affected.
- Implement suitable risk controls within agreed timeframes. These may include competency based training, adequate supervision and adoption of safe operating procedures. Choose these risk controls in consultation with those involved or affected.
- Inform staff, students and contractors of WHS requirements and expectations, directing them to relevant information and risk control resources available. This may include local WHS induction (refer to the [WHS induction checklist](#)), on-the-job instruction and specific WHS training.
- Promptly address WHS issues that are brought to your attention in consultation with those involved or affected.
- Refer WHS issues that are beyond your control to the relevant manager(s) for their attention, but ensure that interim action is taken to reduce the risks in a practical way.
- Investigate incidents, seeking to identify the causes and take steps to prevent recurrence.

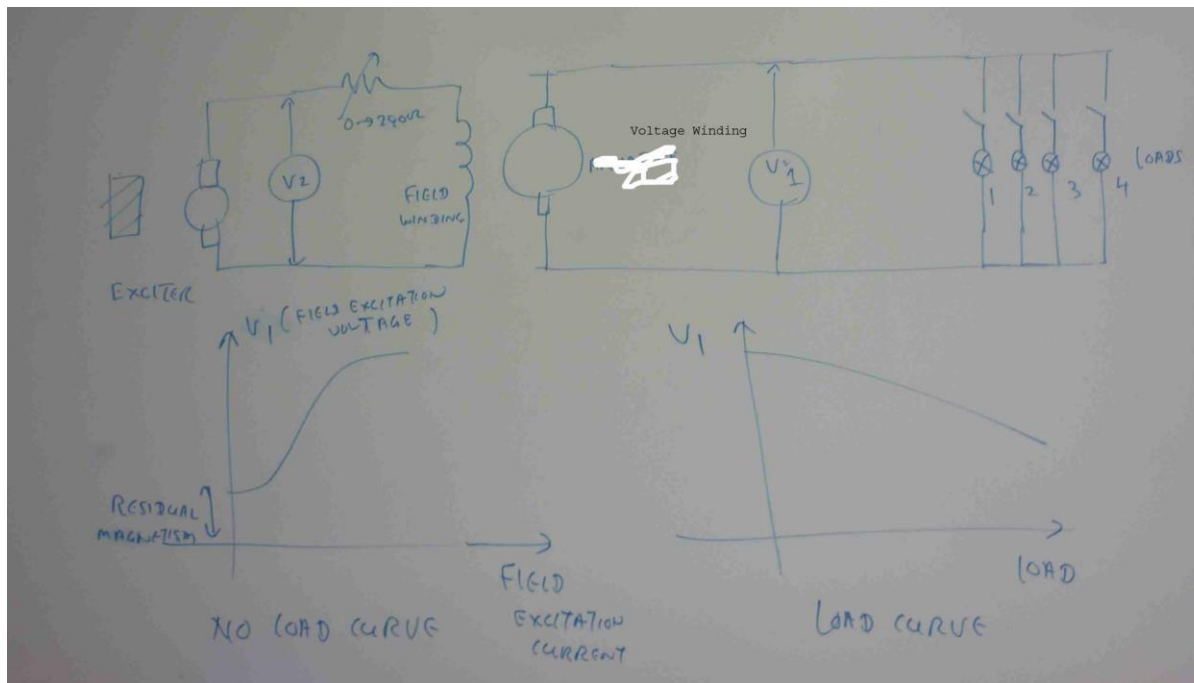
1.3

The extent of the machine problem is obtained from documentation and from work supervisor to establish the scope of work to be undertaken.

The performance characteristics of AC Generator is to be assessed by performing the following practical tasks.

Practical 1-Generator Load Test





In the above circuit, AC Generator is also coupled to motor drive system & its Synchronous characteristics is to be determined.

Students performance in the practical is assessed.

1.4 Activities are planned to meet scheduled timelines in consultation with others involved in the work.

Students cooperation & performance in the practical is assessed.

1.5 Effective strategies are formed to ensure solution development and implementation is carried out

1.5 Effective strategies are formed to ensure solution development and implementation is carried out efficiently.

Ref-Advanced Diploma in Electrical Engineering Exercises Page 208)

(3) Strategy objective

Slide 1+2

Q11.What are the developing of strategies in project?

Q12.How will you examine the effectiveness of activities in project management?

Students co-operation in the practical is evaluated.

2 Develop engineering solution for synchronous machine problems.

2.1 Established OHS risk control measures and procedures for carrying out the work are followed.

As per 1.1, 1.2 & 1.3

2.2 Knowledge of synchronous machine construction, operation, characteristics and

applications are applied to developing solutions to synchronous machine problems.

2.3 Parameters, specifications and performance requirements in relation to each machine

problem are obtained in accordance with established procedures.

2.4 Approaches to resolving synchronous machine problems are analysed to provide most effective solutions.

2.5 Unplanned events are dealt with safely and effectively consistent with regulatory

requirements and enterprise policy.

2.6 Quality of work is monitored against personal performance agreement and/or established

organizational or professional standards.

ASSESSMENT

The students' performance in the following questions are to be assessed.

1. A 400 hp (300KW) , 6600V 60HZ 200 rpm synchronous motor operates at full load at a leading power factor of 0.8. If the synchronous reactance is 11 ohm Calculate the followings

- (a) The apparent power of the motor per phase
- (b) The ac line current
- (c) The value and phase of E_f
- (d) Determine the torque angle δ (4 marks)

2. The factory has the following loads.

(i) Two 50 HP 3 phase induction motors PF 0.707 lagging efficiency 90%

(ii) Three 40 KW 3 phase induction motor power factor 0.8 lagging efficiency 95%

(iii) If 1 60 KW 3 phase synchronous motor with efficiency 98% 0.6 pf leading is connected in parallel Calculate total active and reactive power absorbed from the supply and total power factor.

(4 marks)

3. Sketch the connection diagram of synchronous induction motor.

(2 marks)

4. Describe (i) Auxiliary motor starting (ii) Induction motor starting of a synchronous motor.

(2 marks)

5. What is significant difference between synchronous motor and induction motor?

(2 marks)

6. A synchronous capacitor is rated at 160 MVAR 16 KV 1200 rpm 60 HZ. It has a synchronous reactance of 0.8 pu and is connected to a 16 KV line.

Calculate the value of E_f so that the machine

- (a) absorb 160 MVAR
- (b) deliver 120 MVAR

3 Test, document and implement engineering solution for synchronous machine problem.

3.1 Solutions to machine problems are tested to determine their effectiveness and modified where necessary.

3.2 Adopted solutions are documented including instruction for their implementation that incorporates risk control measure to be followed.

3.3 Appropriately competent and qualified person(s) required to implement solutions to synchronous machine problems are coordinated in accordance with regulatory requirements and enterprise policy. (Note)

3.4 Justification for solutions used to solve synchronous machine problems is documented for inclusion in work/project development records in accordance with professional

EKAS Assessment

SAG Sem 2-2016 –U Kyaw Naing (Joe)/ASSESSMENT Mapping –Sem 2-2016/G143+145 Assessment Mapping/G143+145 Tests—Test 3 Q1,Q2,Q3,Q4,Q5,Q6

DELIVERY TO ACHIEVE THE COMPETENCY

Study Option (1)

Guided study (Online)Resources+Online exercises+Online Practicals

Click [HERE](#)

&

Youtube Videos for Electrical Engineering Lessons

<http://www.mongroupsydne1.com/youtubevideos.htm>

www.electricaldiploma2013.webs.com

Study Option (1)

Guided study (Online)Resources+Online exercises+Online Practicals

Click [HERE](#)

[Elect Machine-G043+G044+G045.zip](#)

[Electrical Machines](#)

[AC Machines 1](#)

[AC Machines 2](#)

[The students will have to answers the following questions](#)

Slide 1+2+3

Q64.Explain the major difference between induction machine and synchronous machine.

Slide 3+4+5+6

Q65.Explain the construction of synchronous machine

(12) Synchronous generator

Slide 1

Q66.Sketch the equivalent circuit , vector diagram and write the voltage equation for synchronous generator.

Slide 2

Q67.Sketch the circuit, vector diagram and write the voltage equation for synchronous motor.

(13) Effect of field excitation

Slide 1+2

Q68. Explain the effect of field excitation on power factor of synchronous motor.

Slide 3+4+5

Q69. A three phase star connected alternator has a resistance of 0.3Ω and a synchronous reactance of 7Ω per phase. It is excited to give 6.6KV line voltage on open circuit. Determine the internal voltage and per unit voltage regulation on full load current of 150 amp when the load power factor is (a) 0.707 lagging (b) 0.8 leading.

Slide 6+7

Q70. A 4000 Kw 6.6 KV 50 HZ 250 rpm synchronous motor operates at full load 0.7 leading power factor if the synchronous reactance is 15Ω . Calculate the followings

- (a) The apparent power of the motor per phase
- (b) The AC line current
- (c) The value and phase of E_f
- (d) Determine the torque angle δ

Slide 8+9+10

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Q71. A synchronous condenser is rated at 260MVAR 26 KV 1500 rpm, 60HZ. It has a synchronous reactance of 0.8 pu and is connected to 26KV line. Calculate the value of E_f so that the machine (a) absorb 200MVAR (b) deliver 150 MVAR

(14) Oscillation of synchronous machines

Slide 1+2

Q72. A 3000KV three phase 4 poles star connected synchronous machine has resistance and synchronous reactance per phase of 0.3Ω and 2Ω respectively. Calculate the emf and rotor displacement when the machine acts as a motor with input of 700MW and pf 0.9 lagging.

If the field current is required to produce emf / ph equal to rated voltage. Determine also field current for field excitation.

Slide 3+4+5+6

Q73. The factory has the following loads.

(a) 3 x 50HP three phase induction motor PF 0.6 lagging , efficiency 85%

(b) 4 x 45 Kw three phase induction motor 0.85 pf lagging, efficiency 90%

Calculate total active and reactive power. If one 100KW three phase synchronous motor with 97% efficiency, 0.65 leading pf is connected in parallel, calculate total active and reactive power and power factor.

Slide 6+7+8

Q74. Explain starting methods for synchronous motor.

Slide 9+10

Q75. Compare synchronous motor & induction motor

Slide 11+12 (Single phase motor)

Q76.Explain (a) cross field theory (b) rotating field theory of single phase motor.

(15) Generator control

Slide 1+2

Q77.Explain the control of electric generating system.

Slide 3+4

Q78.Explain voltage regulator.

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Slide 5+6+7

Q79.Explain prime mover & governor

Slide 8+9

Q80.Explain the types of excitations

Slide 10+11

Q81.How will you select the regulator to control generator voltage?

Slide 12+13

Q82.What are the factors affecting voltage stability of generator system?

Slide 14+15

Q83. Sketch remote voltage sensing system

Slide 16

Q84.Explain typical generator instability problem.

Slide 17+18+22+23

Q85.Explain digital excitation system.

Slide 19+20+21

Q86.Sketch generator parallel control system.

Slide 24

Q87.Explain digital voltage regulation system.

Refer Question & Marking Scheme for Tests

EKAS Components	Assessment Tasks
<p>KS01-EG143A Synchronous machine diagnostics</p> <p>Evidence shall show an understanding of developing engineering solutions for synchronous machine problems to an extent indicated by the following aspects:</p> <p>T1 a.c. generators – construction, types and cooling encompassing:</p> <ul style="list-style-type: none">☐ construction of stator and rotor windings☐ rotor construction (cylindrical and salient pole)☐ advantages of rotating field construction☐ excitation methods☐ cooling methods	<p>www.electricaldiploma2013.webs.com</p> <p><u>Youtube Videos for Electrical Engineering Lessons</u></p> <p>G043+G045+ G143+145+I145</p> <p>Page 308 to 329 of</p> <p>http://www.filefactory.com/file/cf9bf8f/n/Video_Lessons.pdf</p> <p><u>Induction and synchronous machines & control</u></p> <p>G043+G045 Lesson 1 AC Machine Introduction.zip</p> <p>http://youtu.be/-WlfOPhNDn8</p> <p>G043+G045 Lesson 2 Slip+Equivalent Ckt.zip</p>

<ul style="list-style-type: none"> ☐ prime movers T2 a.c. generators – operating principles and characteristics encompassing: ☐ a.c. generator equivalent circuits (synchronous reactance and resistance components) ☐ tests – open circuit, short circuit, stator impedance ☐ voltage regulation, island generator’s terminal voltage load power factor ☐ determination of excitation voltage and load angle 	<p>http://youtu.be/De79cbk2EOQ</p> <p>http://youtu.be/gprZTitiOao</p> <p>G043+G045 Lesson 3 Power Transfer.zip</p> <p>http://youtu.be/pCMcMPBrUEE</p> <p>http://youtu.be/7tJjDuG5SQc</p> <p>http://youtu.be/dV9VFsXeFnY</p> <p>G043+G045 Lesson 4 Test for equivalent ckt.zip</p> <p>http://youtu.be/HF4bJ6vWX2c</p>
<ul style="list-style-type: none"> T3 Synchronising a.c. generators encompassing: ☐ conditions for synchronising (infinite bus) ☐ methods for synchronising (lamp methods, synchroscope) ☐ alternator load sharing, parallel operation T4 a.c. generators power, torque and efficiency encompassing: ☐ power input, input torque, speed ☐ power losses ☐ output power, load power factor, rotor angle, pu power 	<p>G043+G045 Lesson 5 Equivalent Ckt Problems.zip</p> <p>http://youtu.be/PyPQsw0L_o0</p> <p>http://youtu.be/f8VbD_APNfk</p> <p>http://youtu.be/SROLC5hkoc0</p> <p>G043+G045 Lesson 6 Motor starting and control.zip</p> <p>http://youtu.be/Utfbzs7Ti6M</p> <p>http://youtu.be/VnNlesPgeZk</p> <p>http://youtu.be/AMO70oGS2Fs</p> <p>http://youtu.be/FQVMCMDSTwo</p> <p>G043+G045 Lesson 7 Synchronous machine introduction.zip</p>

<ul style="list-style-type: none"> ☐ efficiency 	http://youtu.be/KM9TJcr2MBk
<ul style="list-style-type: none"> ☐ performance chart interpretation 	
<p>T5 Voltage regulation (AVR) encompassing:</p>	<p>G043+G045 Lesson 8 Synchronous machine ckt problems.zip</p>
<ul style="list-style-type: none"> ☐ need for AVR's 	http://youtu.be/ZGsmZfLiPoc
<ul style="list-style-type: none"> ☐ features of AVR's 	http://youtu.be/bnpYxKtSz1c
<ul style="list-style-type: none"> ☐ effects of rotor inductance 	
<ul style="list-style-type: none"> ☐ connections of AVRs 	<p>G043+G045 Lesson 9 Synchronous machine starting.zip</p>
<ul style="list-style-type: none"> ☐ operation of AVRs 	http://youtu.be/p4x03LkgBc8 http://youtu.be/yKmNWaxT2Hk
<p>T6 a.c. generator operational stability encompassing:</p>	
<ul style="list-style-type: none"> ☐ power output, VAR effects, rotor angle, excitation 	<p>G043+G045 Lesson 10 Single phase motor.zip</p>
<ul style="list-style-type: none"> ☐ control of VAR (OLTC transformers) 	http://youtu.be/9OgmEb0tFpE
<ul style="list-style-type: none"> ☐ voltage dependant nature of stability 	<p>G043+G045 Lesson 11 Factors affecting motor operation.zip</p>
<ul style="list-style-type: none"> ☐ critical clearance angle of a.c. generator 	http://youtu.be/sAqyhDlpwwY
<ul style="list-style-type: none"> ☐ stability limits 	
<p>T7 a.c. generator protection encompassing:</p>	
<ul style="list-style-type: none"> ☐ restricted, unrestricted primary, back up and duplicated protection 	
<ul style="list-style-type: none"> ☐ overcurrent, short circuit, differential, reverse power, load unbalance, rotor 	
<p>overload, loss-of-field, rotor earth fault, station</p>	

earth fault, under frequency

protection

☒ external fault protection

T8 Induction generator encompassing:

☒ types operating principles, characteristics

☒ excitation methods

☒ losses and efficiency

☒ synchronising and paralleling

T9 Three phase synchronous motors encompassing:

☒ construction – rotor, stator, windings

☒ excitation methods

☒ operating principles (equivalent circuits, synchronous impedance)

☒ hunting and stability limits

☒ power factor correction

☒ paralleling and synchronisation techniques

☒ starting methods

☒ braking methods

Performance Criteria	Assessment 1 Practical		Assessment 2 Theory
	Continuous Observation	Written Assessment as part of Practical	Written Assessment
1.1	X		
1.2	X		
1.3	X	X	
1.4		X	X
1.5		X	X
2.1	X		
2.2		X	X
2.3		X	X
2.4		X	X
2.5		X	X
2.6		X	X
2.7		X	X
3.1		X	X
3.2		X	X
3.3		X	X
3.4		X	X
EKAS Assessment		X	X

Location of Evidences (Table 1)

Performance Criteria	Above	Location of Evidences
Marking Guide/ Assessment Cover/ Feedback own record		

		<p>ASSESSMENT QUESTIONS IN THE TESTS ARE BASED ON THE QUESTIONS ATTACHED WITH THIS ASSESSMENT MAPPING, BUT IN ACTUAL ASSESSMENT, THEY ARE MODIFIED, EXTRACTED SOME PARTS, APPLIED THE SIMILAR ONES, ALTER AND UTILIZED IN ASSESSMENT TASKS & THEORY TESTS FROM TIME TO TIME</p>
Students' work in own record	Summative Assessment- Formal Tests	
	Formative Assessment/Practical+ Class works	
Marking Guide to be presented for audit		
Students' work to be presented for audit		

Assessment Mapping - Template

(streamlined training package)

This template to be used for “new” endorsed streamlined training packages.

Instruction for use: These instructions in RED should be deleted from the completed document. Instructions in BLUE should be written over with appropriate information.

- This template is to be completed by the assessment developer to ensure the assessments meet the training package requirements for the unit of competency.
- It must be used during the assessment validation process.
- Record of this document must be retained in the faculty TAS teamshare teaching section.
- Add rows and columns as required below.

This document should be viewed concurrently with [G145A Assessment Mapping+Performance+Marking Guide.pdf](#)

Click [HERE](#)

Faculty:		College:	
Teaching Section:	Electrical Engineering		
Qualification Number and Name:	Advanced Diploma of Engineering Technology-Electrical/ Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEEEL0043 - Develop engineering solutions for induction machine and control problems		

Copy and paste the following table for each element as required

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
1.Prepare to develop engineering solution for synchronous machine problems	1.1	OHS procedures for a given work area are obtained and understood through established routines and procedures	Test 1 Q1+2 of G145A Assessment Mapping+Performance+ Marking Guide.pdf Page 1		
	1.2	Established OHS risk control measures and procedures	Test 1 Q3+4 of G145A Assessment Mapping+Performance+ Marking Guide..pdf Page 2		
	1.3	The extent of the machine problem is obtained from documentation and from work supervisor to establish the scope of work to be undertaken.		Practical 1, 2,3,4 of G145A Assessment Mapping+Performance +Marking Guide.pdf Page 4+5	
	1.4	Activities are planned to meet scheduled timelines in consultation with others involved in the work.		Observation in Practical 1, 2,3,4 of G145A Assessment Mapping+Performance +Marking Guide.pdf Page 4+5	
	1.5	Effective strategies are formed to ensure solution development and implementation is carried out efficiently.			Advanced Diploma in Electrical Engineering Exercises Page 208) Q 11, 12
2. Develop engineering solution for induction	2.1	Established OHS risk control measures and procedures for carrying out the work are followed.	As per 1.1,1.2,1.3		

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
machine problems.					
	2.2	Knowledge of induction machine construction, operation, characteristics and applications are applied to developing solutions to synchronous machine problems.	Test 1 Q1 to 12 of G145 A Assessment Mapping+Performance+ Marking Guide.pdf Page 6 to 8		
	2.3	Parameters, specifications and performance requirements in relation to each machine problem are obtained in accordance with established procedures	As above		
	2.4	Approaches to resolving synchronous machine problems are analysed to provide most effective solutions.	As above		
	2.5	Unplanned events are dealt with safely and effectively consistent with regulatory requirements and enterprise policy.	As above		
3 Test, document and implement engineering solution for induction machine problem.	3.1	Solutions to machine problems are tested to determine their effectiveness and modified where necessary.	Q 7 of Test 3 Q 1 to 12 of Test 4		
	3.2	Adopted solutions are documented including instruction for their implementation that incorporates risk control measure to be followed	Q 7 of Test 3 Q 1 to 12 of Test 4		
	3.3	Appropriately competent and qualified person(s) required to implement solutions to synchronous machine problems are coordinated in accordance with regulatory requirements and enterprise policy	Q 7 of Test 3 Q 1 to 12 of Test 4		
	3.4	Justification for solutions used to solve synchronous machine problems is documented for inclusion in work/project development records in accordance with professional	Q 7 of Test 3 Q 1 to 12 of Test 4		

Add rows to the following table as required

Performance Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Three phase motor No Load Test		Practical 1	
Three phase motor speed measurement		Practical 2	
Testing motor winding impedance		Practical 3	
Testing motor winding polarity		Practical 4	
Three phase induction motor winding design diagram			Project 1

Add rows to the following table as required

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T1 Operating principles of polyphase induction motors	Test 2 Q1 +2 of G145 A Assessment Mapping+ Performance+ Marking Guide.pdf Page 9		
T2 Construction of polyphase induction motors	Test 2 Q 4+5 of G145 A Assessment Mapping+ Performance+ Marking Guide.pdf Page 9		
T3 Speed-torque relationships in induction motors	Test 2 Q 9, 10, 25 of G145 A Assessment Mapping+ Performance+ Marking Guide.pdf Page 10+11		
T4 Induction motor performance testing	Test 2 Q 26+27 of G145 A Assessment Mapping+ Performance+ Marking Guide.pdf Page 12		

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T5 Induction motor starters		Refer Practical 6 of UEENEEG006A Direct Online Motor Starter Forward/Reverse Motor Starter Investigation	Test 2 Q 31+32 of G145 A Assessment Mapping+ Performance+ Marking Guide.pdf Page 13
T6 Reduced voltage starting			Advanced Diploma in Electrical Engineering Exercises Page 164) Q 46 to 51
T7 Speed control of induction motors			Advanced Diploma in Electrical Engineering Exercises Page 165) Q 54, 55, 60
T8 Braking of induction motors			Advanced Diploma in Electrical Engineering Exercises Page 165) Q 54, 55, 60
T9 Motor protection			Advanced Diploma in Electrical Engineering Exercises Page 165) Q 62,63

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T10 Motor selection criteria and RMS rating			Advanced Diploma in Electrical Engineering Exercises Page 171) Q 110 to 123
T12 Single phase induction motors			Advanced Diploma in Electrical Engineering Exercises Page 171) Q 105, 106

Add rows to the following table as required

Assessment Conditions	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the welectrical workshop K2.11. Application of safe working practice & regarding the housekeeping rules are to be observed. Emergency procedures are to be informed. Safety equipments & first aids equipments are to be available. The students get the access to <ul style="list-style-type: none"> • Relevant practical equipments Records relating to electrical engineering resources	Test 1, 2, 3,4	Practical	All assignments+ Project

Created by (Name)	U Kyaw Naing (Joe)	Date created	
Approved by (Name)		Date approved	
Signature		Date modified	

UEENEEG145A Develop engineering solutions for induction machine











UNIT CAPSTONE ASSESSMENT

ASSESSMENT QUESTIONS & TESTS ARE BASED ON THE FOLLOWINGS, THEY ARE MODIFIED, EXTRACTED SOME PARTS, APPLIED THE SIMILAR ONES, ALTER AND UTILIZED IN ASSESSMENT TASKS & THEORY TESTS FROM TIME TO TIME.

1.1 Prepare to develop engineering solution for synchronous machine problems

- 1.1 OHS procedures for a given work area are obtained and understood through established routines and procedures.

Q1. Identify safety equipments & signs to be used when you are using fitting & machining

<p>FIRE</p>  <p>BRAND</p>		<p>SL MSF1 - LOCATION OF FIRE FIGHTING EQUIPMENT SL MSF2 - FIRE EXTINGUISHER SL MSF3 - FIRE HOSE SL MSF4 - FIRE HYDRANT SL MSF5 - FIRE ALARM SL MSF6 - SPRINKLER STOP VALVE</p>
<p>MANDATORY</p>  <p>VERPLIGTEND</p>		<p>SL MSM1 - EYE PROTECTION SHALL BE WORN SL MSM2 - RESPIRATORY PROTECTION SHALL BE WORN SL MSM3 - HEAD PROTECTION SHALL BE WORN SL MSM4 - HEARING PROTECTION SHALL BE WORN SL MSM5 - HAND PROTECTION SHALL BE WORN SL MSM6 - FOOT AND LEG PROTECTION AGAINST LIQUIDS SHALL BE WORN SL MSM7 - FOOT PROTECTION AGAINST CRUSHING SHALL BE WORN SL MSM8 - FLAME SAFETY LAMP SHALL BE USED SL MSM9 - APRON SHALL BE WORN SL MSM10 - ACE PROTECTION SHALL BE WORN SL MSM11 - AIR-SUPPLIED HOOD SHALL BE WORN SL MSM12 - DUST MASK SHALL BE WORN SL MSM13 - AIR EXTRACTION SHALL BE WORN SL MSM14 - WASTE BINS SHALL BE USED SL MSM15 - FULL BODY WEAR SHALL BE WORN SL MSM16 - SAFETY HARNESS SHALL BE USED</p>
<p>INFORMATION</p>  <p>INLIGTING</p>		<p>SL MSG1 - FIRST AID EQUIPMENT SL MSG2 - GENERAL DIRECTION SL MSG3 - DIRECTION TO ESCAPE ROUTE SL MSG4 - DIRECTION TO ESCAPE ROUTE SL MSG5 - MANNED FIRST-AID STATION SL MSG6 - DRINKING WATER SL MSG7 - BLASTING POINT SL MSG8 - TRAVELING WAY SL MSG9 - LOCOMOTIVE REFUELLING POINT SL MSG10 - LATRINE FOR MALE EMPLOYEES SL MSG11 - REFUGE CHAMBER SL MSG12 - TELEPHONE SL MSG13 - WAITING PLACE SL MSG14 - EMERGENCY TELEPHONE SL MSG15 - ELECTRICAL ISOLATOR</p>
<p>PROHIBITORY</p>  <p>VERBODEN</p>		<p>SL MSP1 - SMOKING PROHIBITED SL MSP2 - FIRE AND OPEN FLAMES PROHIBITED SL MSP3 - THOROUGHFARE FOR PEDESTRIANS PROHIBITED SL MSP4 - WATER AS EXTINGUISHER PROHIBITED SL MSP5 - DRINKING OF THIS WATER PROHIBITED SL MSP6 - PROCEEDING BEYOND THIS SIGN PROHIBITED SL MSP7 - CYCLING PROHIBITED SL MSP8 - CARRYING OF LONG MATERIAL / OBJECTS PROHIBITED SL MSP9 - HAND TRAMMING PROHIBITED SL MSP10 - LOCOMOTIVES PROHIBITED BEYOND THIS POINT SL MSP11 - USE OF COMPRESSED AIR PROHIBITED SL MSP12 - LOOSE CLOTHING, TIES, JEWELLERY AND UNCONFINED LONG HAIR PROHIBITED</p>
<p>WARNING</p>  <p>WAARSKUWING</p>		<p>SL MSW1 - GENERAL WARNING OF DANGER SL MSW2 - WARNING OF FIRE HAZARD SL MSW3 - WARNING OF EXPLOSION HAZARD SL MSW4 - WARNING OF CORROSION HAZARD SL MSW5 - WARNING OF POISONING SUBSTANCES HAZARD SL MSW6 - WARNING OF IONISING RADIATION HAZARD SL MSW7 - WARNING OF ELECTRICAL SHOCK HAZARD SL MSW8 - WARNING OF SUSPENDED LOADS HAZARD SL MSW9 - WARNING OF METHANE HAZARD SL MSW10 - WARNING OF FRAGILE ROOF SL MSW11 - WARNING OF BIOLOGICAL HAZARD SL MSW12 - WARNING OF LASER SL MSW13 - WARNING OF FALLING OBJECTS HAZARD</p>

process.

[Answers +Marking Guide \(2 marks\)](#)

Safety glass

Safety glove

Safety shoe

Ear protection

First aids sign

Q2 Write the safety procedure to operate the drilling machine

[Answers +Marking Guide \(5 marks\)](#)

PRE-OPERATIONAL SAFETY CHECKS

1. Check workspace and walkways to ensure no slip-hazards are present.
2. Check that the drill chuck guard is in position.
3. Ensure the chuck key (if used) has been removed from the drill chuck.
4. Locate and ensure you are familiar with the operation of the ON/OFF starter and E-Stop (if fitted).
5. Follow correct clamping procedures to ensure work is secure.
6. If the job obstructs the walkway erect a barricade.
7. Adjust spindle speed to suit drill or cutter diameter.
8. Faulty equipment must not be used. Immediately report suspect equipment.

OPERATIONAL SAFETY CHECKS

1. Never leave the Drill Press while it is running.
2. Before making adjustments or before cleaning swarf accumulations switch off and bring the machine to a complete standstill.
3. Feed downwards at a sufficient rate to keep the drill cutting.
4. Feed with care as the drill breaks through the underside of the work.
5. Use a safe working posture (beware of hair catching).

HOUSEKEEPING

1. Switch off the machine.
2. Leave the machine in a safe, clean and tidy state.

POTENTIAL HAZARDS

- Hair/clothing entanglement - rotating spindle/drill
- Eye injuries
- Flying swarf/chips
- Sharp edges & burrs

1.2

Established OHS risk control
measures and procedures

Q3 What are the main source of hazards to use the drilling machine?

[Answers +Marking Guide \(5 marks\)](#)

(1) Hazards related to the machinery or plant, materials or items being processed or internal sources of energy, for example:

- drawing in or trapping hazards;
- entanglement hazards;

- shearing hazards;
- cutting hazards;
- impact hazards;

(2) hazards related to the location of the machine or plant, for example:

- its stability, for instance, whether it could roll or fall over;

(3) hazards related to systems of work associated with the machine or plant, for example manual handling injuries caused when putting materials into them.

To prevent the hazards, the above risks are to be identified & eliminated.

Q4. Write WHS Duty of Care Checklist for Managers/Supervisors

[Answers +Marking Guide \(8 marks\)](#)

WHS Duty of Care Checklist for Managers/Supervisors

- Familiarise yourself with the organization [Work Health & Safety Policy 2016](#) and [Work Health and Safety Procedures](#) to ensure you are aware of your personal responsibility for workplace health and safety (WHS) within your area of delegated authority.
- Ensure that the work for which you are responsible is carried out in accordance with the University's [WHS risk management steps](#) to safeguard the health, safety and wellbeing of those involved and others who may be affected.
- Demonstrate active and visible leadership in WHS risk management. Identify hazards or WHS risks associated with different jobs, tasks and projects and assess the risks to the health and safety of those involved. Conduct this risk identification and assessment in consultation with those involved or affected.
- Implement suitable risk controls within agreed timeframes. These may include competency based training, adequate supervision and adoption of safe operating procedures. Choose these risk controls in consultation with those involved or affected.
- Inform staff, students and contractors of WHS requirements and expectations, directing them to relevant information and risk control resources available. This may include local WHS induction (refer to the [WHS induction checklist](#)), on-the-job instruction and specific WHS training.
- Promptly address WHS issues that are brought to your attention in consultation with those involved or affected.
- Refer WHS issues that are beyond your control to the relevant manager(s) for their attention, but ensure that interim action is taken to reduce the risks in a practical way.
- Investigate incidents, seeking to identify the causes and take steps to prevent recurrence.

1.3

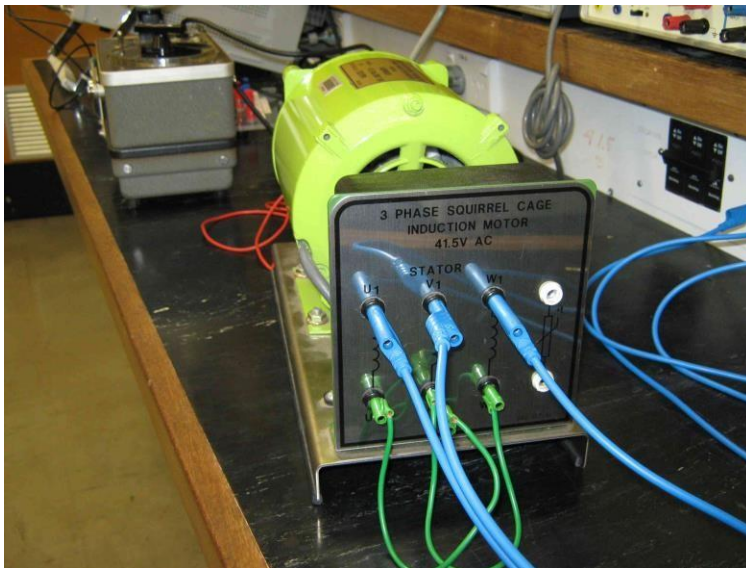
The extent of the machine problem is obtained from documentation and from work supervisor to establish the scope of work to be undertaken.

The performance characteristics of AC Induction Motors are to be assessed by performing the following practical tasks.

Practical 1-Three phase motor No Load Test



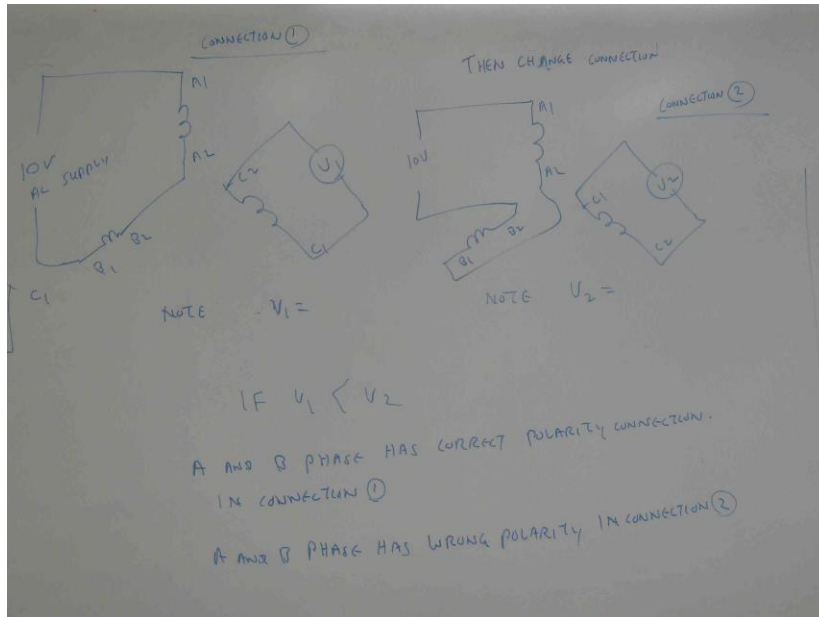
Practical 2 Three phase motor speed measurement



Practical 3 Testing motor winding impedance



Practical 4 Testing motor winding polarity





Students performance in the practical is assessed.

1.4 Activities are planned to meet scheduled timelines in consultation with others involved in the work.

Students cooperation & performance in the practical is assessed.

1.5 Effective strategies are formed to ensure solution development and implementation is carried out

1.5 Effective strategies are formed to ensure solution development and implementation is carried out efficiently.

Ref-Advanced Diploma in Electrical Engineering Exercises Page 208)

(3) Strategy objective

Slide 1+2

Q11.What are the developing of strategies in project?

Q12.How will you examine the effectiveness of activities in project management?

Students co-operation in the practical is evaluated.

2 Develop engineering solution for induction machine problems.

2.1 Established OHS risk control measures and procedures for carrying out the work are followed.

As per 1.1, 1.2 & 1.3

2.2 Knowledge of induction machine construction, operation, characteristics and applications are applied to developing solutions to synchronous machine problems.

2.3 Parameters, specifications and performance requirements in relation to each machine problem are obtained in accordance with established procedures.

2.4 Approaches to resolving induction machine problems are analysed to provide most effective solutions.

2.5 Unplanned events are dealt with safely and effectively consistent with regulatory requirements and enterprise policy.

2.6 Quality of work is monitored against personal performance agreement and/or established organizational or professional standards.

The students' performance in the following questions are to be assessed.

1. Explain the operation principle of capacitor start motor. (3 marks)
2. Sketch the vector diagram of capacitor run motor. (3 marks)
3. Sketch the circuit diagram of capacitor run motor. (3 marks)
4. How will you reverse the direction of the rotation of single phase motor. (1 marks)
5. Explain the operation of shaded pole motor. (3 marks)
6. A small 60Hz hysteresis clock motor possesses 32 poles. In making one complete turn with respect to the revolving field, the hysteresis loss in the rotor amounts to 0.8J
 - (i) Calculate (a) The pull in and pull out torques (b) The maximum power out put before the motor stalls (c) The rotor losses when the motor is stalled (d) The rotor losses when the motor runs at synchronous speed. (4 marks)
7. State (i) Locked rotor torque (ii) Breakdown torque (ii) Sketch the shaded pole and indicate the direction of rotation. (3 marks)
8. Sketch the connection of universal motor. (2 marks)
9. Compare advantages and disadvantages of 1 phase and 3 phase motors. (2 marks)
10. What are the abnormal operating conditions for AC induction motors. (2 marks)
11. A large reel of paper installed at the end of paper machine has a diameter of 1.8 m a length of 5.6 m and a moment of inertia of 4500 kg-m^2 . It is driven by a directly coupled variable speed dc motor turning at 120rpm. The paper is kept under a constant tension of 6000N.
 - (a) Calculate the power of the motor when the reel turns at a constant speed of 120 rpm

- (b) If the speed has to be raised from 120 rpm to 160 rpm in 5 s , calculate the torque that the motor must develop during this interval.
- (c) Calculate the power of the motor after it has reached the desired speed of 160 rpm.
- (d) Calculate the power of the motor after it has reached the desired speed of 160 rpm.

(8 marks)

12. A motor has been idle for several days in an ambient temperature of 19 deg C is found to have a field resistance of 22 ohm. The motor then operates at full load and when temperatures have stabilized, the field resistance is found to be 30 ohm. The corresponding ambient temperature is 24 deg C. If the motor is built with class B insulation.

Calculate the followings

- i. The average temperature of the winding at full load
- ii. The full load temperature rise by the resistance method.
- iii. Whether the motor meets the temperature standards.

(6 marks)

3 Test, document and implement engineering solution for induction machine problem.

3.1 Solutions to machine problems are tested to determine their effectiveness and modified where necessary.

3.2 Adopted solutions are documented including instruction for their implementation that incorporates risk control measure to be followed.

3.3 Appropriately competent and qualified person(s) required to implement solutions to synchronous machine problems are coordinated in accordance with regulatory requirements and enterprise policy. (Note)

3.4 Justification for solutions used to solve synchronous machine problems is documented for inclusion in work/project development records in accordance with professional

EKAS Assessment

DELIVERY TO ACHIEVE THE COMPETENCY

Study Option (1)

Guided study (Online)Resources+Online exercises+Online Practicals

Click **HERE**

&

Youtube Videos for Electrical Engineering Lessons

<http://www.mongroupsydne1.com/youtubevideos.htm>

www.electricaldiploma2013.webs.com

Study Option (1)

Guided study (Online)Resources+Online exercises+Online Practicals

Click **HERE**

[Elect Machine-G043+G044+G045.zip](#)

[Electrical Machines](#)

[AC Machines 1](#)

[AC Machines 2](#)

[The students will have to answers the following questions](#)

_(1) AC Machine introduction

Slide 1+2+3

Q1. Derive the formula to calculate rotating magnetic field.

Slide 4+5

Q2. Calculate the synchronous speed of a three phase induction motor having 12 poles, 60HZ.

Slide 6

Q3. Explain the starting characteristics of squirrel cage motor.

Slide 7.

Q4. Sketch the construction of squirrel cage induction motor and wound rotor motor.

Slide 8+9+10+11+12

Q5. Design three phase 48 slots 4 poles winding.

(2) Induction motor

Slide 1

Q6. What is distribution factor?

Slide 2

Q7. What is coil span factor?

Slide 3

Q8. How do distribution factor & coil span factor affect the induced emf ?

Slide 4+5

Q9. A 0.7 HP 4 poles induction motor is excited by a single phase 540HZ source. Its full load speed is 1160 rpm. Calculate the slip.

Slide6+7

Q10.The 4 pole wound rotor induction motor is excited by a three phase 50HZ . Calculate the frequency of the rotor current under the following conditions.

(a) At stand still

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(b) Motor turning at 600 rpm in the same direction as the revolving field.

(c) Motor turning at 600 rpm in the opposite direction to the revolving field.

(d) Motor turning at 1800 rpm in the same direction to the revolving field.

Slide 8+9+10

Q11.(a) Calculate the approximate full load current . locked rotor current and no load current of a three phase induction motor having a rating of 600HP, 2400V.

(b) Estimate the apparent power drawn under locked rotor conduction.

(c) State the normal rating of this motor expressed in kilowatt.

(3) Motor equivalent circuit.

Slide 1+2

Q12.Sketch the equivalent circuit & equation of induction motor.

(4) Wound rotor motor

Slide 1

Q13. Sketch DOL starter

Q14. Write equations for locked rotor current & locked rotor torque.

Slide 2+3+4

Q20. Write the equation for motor current at stand still condition & any slip.

Q21. A 440V 6 poles three phase 50 Hz induction motor has its winding delta connected & its rotor winding star connected. The standstill voltage measured between slip ring with the rotor open circuit 220V. The stator resistance / phase is 0.7 ohm and the stator reactance / phase is 5 ohm. The rotor resistance per phase is 0.07 ohm and rotor reactance per phase is 0.3 ohm. Calculate the rotor current and stator current when slip rings are short circuited to start the motor. Calculate rotor power factor & stator power factor.

Slide 5

Q22. In above problem, calculate rotor current and stator current when slip rings are connected to 5 ohm external resistance and motor is running at 0.04 slip.

Slide 6

Q23. Sketch power transfer in induction machine for (a) motor mode (b) generator mode.

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Slide 7+8

Q24. Write the following equations.

(a) Power absorbed by ideal stator winding

(b) Power dissipated in rotor circuit.

- (c) Mechanical power
- (d) Power dissipated in rotor resistance
- (e) Rotor circuit power loss
- (f) Power absorbed by ideal stator winding.

Slide 9

Q25. A 400 V 4 poles three phase 60Hz slip ring induction motor has its stator winding delta connected and rotor winding star connected. The standstill voltage measured between slip rings with the rotor open circuited is 220V. The stator resistance per phase is 4 ohm. The rotor resistance per phase is 0.08 ohm and the rotor reactance per phase is 0.35 ohm. Calculate the maximum torque & slip.

(5) Torque + Motor test

Slide 1

Q26. Sketch the power flow diagram in motor.

Q27. Write the equation for

- (a) Mechanical power developed by rotor
- (b) Mechanical power delivered to load.
- (c) Mechanical torque.

(6) Synchronous speed + Slip + Power of motor

Slide 1

Q28. A three phase induction motor having synchronous speed of 1200 rpm draws 90kw from three phase feeder. Copper loss & iron loss in stator amount to 7kw. If the motor runs at 1140 rpm, calculate the followings.

(a) Active power transmitted to the rotor

(b) Rotor I² R loss.

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(c) Mechanical power developed.

(d) The mechanical power delivered to the load knowing that the windage & friction losses are equal to 1.5 kw.

(e) The efficiency of motor.

Slide 2+3

Q29. A three phase 8 poles squirrel cage induction motor connected to 50Hz line possesses a rotor speed 1000 rpm. The motor absorbs 45kw and the copper & iron losses in the stator to 6 kw & 2 kw respectively. Calculate the torque developed by motor.

Slide 3+4

Q30. A three phase induction motor having a nominal rating of 80 kw and synchronous speed of 1800 rpm is connected to 660V source. Two meters method show a total power consumption 80kw and an ammeter indicates a line current 77 amp. Rotor speed is 1750 rpm. The following ratings are obtained. Stator iron loss = 2.5 kw, windage and friction loss = 1.5 kw. Resistance between two

stators = 0.3 ohm.

Calculate (a) Power supplied to the rotor.

(b) Rotor I² R loss

(c) Mechanical power supplied to the load

(d) Efficiency

(e) Torque developed at 1750 rpm.

(7) Motor starters

Slide 1+2

Q31. Describe the motor reduced voltage starting methods.

Slide 3+4+5+6

Q32. Sketch DOL starter.

(8) Three phase motor equivalent circuit

Slide 1+2+3

Q33. Explain the tests to determine the equivalent circuit of three phase motor.

Slide 4+5

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Q34. A no load test conducted on a 50HP 900 rpm 415 V three phase 50HZ squirrel cage induction

motor yield the following results

No load test

No load voltage (L- L) = 415V

No load current = 15 A

No load power = 1450 watt

Resistance measured between two terminals

Locked rotor test

The locked rotor test conducted at reduced voltage gave the following results

Locked voltage (L to L) = 170V

Locked rotor power = 7500w

Locked rotor current = 70A

Determine the equivalent circuit of motor.

[Refer Question & Marking Scheme for Tests](#)

EKAS Components	Assessment Tasks
<p>KS01-EG145A Induction machines diagnostics</p> <p>Evidence shall show an understanding of developing engineering solutions for induction motor problems to an extent indicated by the following aspects:</p> <p>T1 Operating principles of polyphase induction motors encompassing:</p>	<p>SAG Sem 2-2016 –U Kyaw Naing (Joe)/ASSESSMENT Mapping –Sem 2-2016/G143+145 Assessment Mapping/G143+145 Tests</p> <p>www.electricaldiploma2013.webs.com</p> <p><u>Youtube Videos for Electrical Engineering Lessons</u></p> <p>G043+G045+ G143+145+I145</p> <p>Page 308 to 329 of</p>

<ul style="list-style-type: none"> ❑ rotating magnetic field torque slip 	http://www.filefactory.com/file/cf9bf8f/n/Video_Lessons.pdf
<ul style="list-style-type: none"> ❑ MMF relationships 	<p><u>Induction and synchronous machines & control</u></p>
<ul style="list-style-type: none"> ❑ Leakage fluxes 	<p>G043+G045 Lesson 1 AC Machine Introduction.zip</p>
<p>T2 Construction of polyphase induction motors encompassing:</p>	<p>http://youtu.be/-WfOPhNDn8</p>
<ul style="list-style-type: none"> ❑ squirrel cage motors 	<p>G043+G045 Lesson 2 Slip+Equivalent Ckt.zip</p>
<ul style="list-style-type: none"> ❑ slip-ring motors 	<p>http://youtu.be/De79cbk2EOQ</p>
<ul style="list-style-type: none"> ❑ construction considerations in minimisation of tooth locking 	<p>http://youtu.be/gprZTitiOao</p>
<p>T3 Speed-torque relationships in induction motors encompassing:</p>	<p>G043+G045 Lesson 3 Power Transfer.zip</p>
<ul style="list-style-type: none"> ❑ maximum torque 	<p>http://youtu.be/pCMcMPBrUEE</p>
<ul style="list-style-type: none"> ❑ torque – slip relationships 	<p>http://youtu.be/7tJjDuG5SQc</p>
<ul style="list-style-type: none"> ❑ squirrel cage rotor types 	<p>http://youtu.be/dV9VFsXeFnY</p>
<ul style="list-style-type: none"> ❑ power flow in the motors 	<p>G043+G045 Lesson 4 Test for equivalent ckt.zip</p>
<ul style="list-style-type: none"> ❑ power distribution 	<p>http://youtu.be/HF4bJ6vWX2c</p>
<ul style="list-style-type: none"> ❑ torque units 	<p>G043+G045 Lesson 5 Equivalent Ckt Problems.zip</p>
<ul style="list-style-type: none"> ❑ slip ring rotors 	<p>http://youtu.be/PyPQsw0L_o0</p>
<p>T4 Induction motor performance testing encompassing:</p>	<p>http://youtu.be/f8VbD_APNfk</p>
<ul style="list-style-type: none"> ❑ no-load test 	<p>http://youtu.be/SROLC5hkoc0</p>
	<p>G043+G045 Lesson 6 Motor starting and control.zip</p>

locked rotor tests	http://youtu.be/Utfbzs7Ti6M
▣ development of motor equivalent circuit from test results	http://youtu.be/VnNlesPgeZk http://youtu.be/AMO70oGS2Fs
▣ analysis of motor performance using circle diagrams	http://youtu.be/FQVMCmDSTwo
T5 Induction motor starters encompassing:	G043+G045 Lesson 7 Synchronous machine introduction.zip
▣ starting requirements	http://youtu.be/KM9TJcr2MBk
▣ type of starters	G043+G045 Lesson 8 Synchronous machine ckt problems.zip
▣ starting torque	http://youtu.be/ZGsmZfLiPoc
▣ starting dynamics	http://youtu.be/bnpYxKtSz1c
▣ static friction	
▣ mechanical loads	G043+G045 Lesson 9 Synchronous machine starting.zip
▣ starting duration	http://youtu.be/p4x03LkgBc8
T6 Reduced voltage starting encompassing:	http://youtu.be/yKmNWaxT2Hk
▣ starting dynamics	
▣ change over conditions	G043+G045 Lesson 10 Single phase motor.zip
▣ starting duration	http://youtu.be/9OgmEb0tFpE
▣ acceleration curves	G043+G045 Lesson 11 Factors affecting motor operation.zip
T7 Speed control of induction motors encompassing:	http://youtu.be/sAqyhDlpwwY
▣ constant torque, constant power concepts	

☐ torque-flux-voltage relationships

☐ rotor resistance control

☐ stator impedance control

☐ variable frequency control (e.g. PAM, PWM, Flux vector control)

T8 Braking of induction motors encompassing:

☐ electrical braking systems (plugging, d.c. dynamic, regenerative,

capacitor-magnetic)

☐ mechanical braking systems (mechanical drum, demag, eddy current)

T9 Motor protection encompassing:

☐ overload

☐ earth fault

☐ phase failure

T10 Motor selection criteria and RMS rating

T11 Induction motor maintenance/repair encompassing:

☐ routine maintenance schedules

☐ type of repairs (mechanical, electrical)

T12 Single phase induction motors encompassing:

<input type="checkbox"/> operating principles (especially RMF) <input type="checkbox"/> construction types speed-torque relationships <input type="checkbox"/> testing	
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ASSESSMENT SCHEDULE

Performance Criteria	Assessment 1 Practical		Assessment 2 Theory
	Continuous Observation	Written Assessment as part of Practical	Written Assessment
1.1	X		
1.2	X		
1.3	X	X	
1.4		X	X
1.5		X	X
2.1	X		
2.2		X	X
2.3		X	X
2.4		X	X
2.5		X	X
2.6		X	X
2.7		X	X
3.1		X	X
3.2		X	X
3.3		X	X
3.4		X	X
EKAS Assessment		X	X

Location of Evidences (Table 1)

Performance Criteria	Above	Location of Evidences
Marking Guide/ Assessment Cover/ Feedback own record		<p style="text-align: center;">ASSESSMENT QUESTIONS IN THE TESTS ARE BASED ON THE QUESTIONS ATTACHED WITH THIS ASSESSMENT MAPPING, BUT IN ACTUAL ASSESSMENT, THEY ARE MODIFIED, EXTRACTED SOME PARTS, APPLIED THE SIMILAR ONES, ALTER AND UTILIZED IN ASSESSMENT TASKS & THEORY TESTS FROM TIME TO TIME</p>
Students' work in own record	Summative Assessment- Formal Tests	
	Formative Assessment/Practical+ Class works	
Marking Guide to be presented for audit		
Students' work to be presented for audit		

Advanced Diploma in Electrical Engineering Exercises

[Click HERE](#)

UEEEL0077 Evaluate and report on the performance of LV machines

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
1. Prepare to evaluate and report on the performance of LV Machines	1.1	Work, health and safety (WHS) / occupational health and safety (OHS) risk control measures are identified and applied	Concurrently assessed with Synchronous and Induction machines problems		
	1.2	Machines to be evaluated, and scope of works to be undertaken are identified and confirmed	Concurrently assessed with Synchronous and Induction machines problems		
	1.3	Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety	Concurrently assessed with Synchronous and Induction machines problems		
2. Evaluate single and three phase low voltage machines	2.1	Correct machine is identified for a specified range of applications	Concurrently assessed with Synchronous and Induction machines problems		

	2.2	Machine performance is evaluated from measured and calculated values as they apply to single and three-phase low voltage machines and results are recorded	Concurrently assessed with Synchronous and Induction machines problems		
	2.3	Problems are diagnosed, recorded, and solutions are identified	Concurrently assessed with Synchronous and Induction machines problems		
3.Complete work and document problem solving activities.	3.1	Results of evaluation and recommendations are reported	Concurrently assessed with Synchronous and Induction machines problems		
	3.2	Justification for identified solutions is reported	Concurrently assessed with Synchronous and Induction machines problems		
	3.3	Work completion is documented, and an appropriate person notified	Concurrently assessed with Synchronous and Induction machines problems		

Assessment Mapping - Template

(streamlined training package)

This template to be used for “new” endorsed streamlined training packages.

Instruction for use: These instructions in RED should be deleted from the completed document. Instructions in BLUE should be written over with appropriate information.

- This template is to be completed by the assessment developer to ensure the assessments meet the training package requirements for the unit of competency.
- It must be used during the assessment validation process.
- Record of this document must be retained in the faculty TAS teamshare teaching section.
- Add rows and columns as required below.

This document should be viewed concurrently with [E137A Assessment Mapping+Performance+Marking Guide.pdf](#)

Click [HERE](#)

Faculty:		College:	
Teaching Section:	Electrical Engineering		
Qualification Number and Name:	Advanced Diploma of Engineering Technology-Electrical/ Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEECD0016 - Document and apply measures to control WHS risks associated with electrotechnology work		

Copy and paste the following table for each element as required

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
1. Identify and document hazards and risks.	1.1	Hazards are identified the appropriate persons involved and in accordance with compliance procedures.	Q1 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 1)		
	1.2	Risks associated with identified hazards are determined in consultation with others and documented in accordance with compliance procedures	Q2 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 1)		
			Q3+4 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 2)		
2. Assign levels of risk and develop and document control measures.	2.1	Level of risk is assigned for each identified hazard in accordance with the regulations and following compliance procedures.		Activity 1 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 4)	
	2.2	Control measures are developed for hazard, level of risk and activity to eliminate and/or mitigate the risk following compliance procedures.		Activity 2 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 4)	

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
	2.3	Level of risk is re-assessed to confirm the required control measures reduce the risk level to as low as reasonably practicable			
	2.4	Hazard, level of risk and control measures are agreed to and documented in consultation with all involved in accordance with compliance procedures		Activity 3 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 4)	
3. Monitor and review the control measures.	3.1	Documented control measures are made available for reference by all involved with the work.		Activity 4 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 4)	
	3.2	Control measures are modified where required in consultation with all involved with the work in accordance with compliance procedures.		Activity 5 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 4)	
	3.3	Document and apply measures to control WHS/OHS risks associated with electrotechnology work		Activity 6 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 5)	
	3.4	Changes and updates are made to relevant documentation, risk register as additional hazards are identified			
	3.5	Documentation of hazards, risks control measures and their application are filed in accordance with workplace procedures			

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Add rows to the following table as required

Performance Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
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Performance Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Identification of hazards	Q1 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 1)		
Types of hazards & risks	Q2 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 1)		
Risk assessment		Activity 1 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 4)	
Control of hazards		Activity 2 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 4)	
Risk control documentation		Activity 3+4+5+6 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 4)	

Add rows to the following table as required

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T1 Risk management and assessment of risk T7 Determine the degree of the risk		Activity 1 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 4)	
T3 Hazards associated with extra-low voltage, low-voltage and high-currents	Q1 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 1)		
T4 Hazards and risks and control measures associated with high-voltage	Q2 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 1)		
T2 Hazards and risks and control measures in working on construction sites T5 Hazards and risks and control measures in working with low voltage equipment T6 Hazards and risks and control measures associated with harmful, devices,		Activity 2 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 4)	
T8 Use control measures to eliminate or control the risk T9 Engaging in monitoring and reviewing processes to ensure control measures remain valid		Activity 3+4+5+6 of E137A Assessment Mapping+ Performance+ Marking Guide.pdf (Page 4)	

Add rows to the following table as required

Assessment Conditions	Assessment	Assessment	Assessment
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	event 1 Written Test	event 2 Practical & Observation	event 3 Assignment
Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the welectrical workshop K2.11. Application of safe working practice & regarding the housekeeping rules are to be observed. Emergency procedures are to be informed. Safety equipments & first aids equipments are to be available. The students get the access to <ul style="list-style-type: none"> Relevant practical equipments Records relating to electrical engineering resources 	All test	All practical	

Created by (Name)	U Kyaw Naing (Joe)	Date created	16 August 2016
Approved by (Name)		Date approved	
Signature		Date modified	

UEENEEE137A Document and apply measures to control OHS risks associated with electrotechnology work

ASSESSMENT QUESTIONS & TESTS ARE BASED ON THE FOLLOWINGS, THEY ARE MODIFIED, EXTRACTED SOME PARTS, APPLIED THE SIMILAR ONES, ALTER AND UTILIZED IN ASSESSMENT TASKS & THEORY TESTS FROM TIME TO TIME.

1. Identify and document hazards and risks.

1.1 Hazards are identified the appropriate persons involved and in accordance with compliance procedures.

Q1. How can hazards be identified?

Marking Guide+Answers 4 Marks

1. Talk with workers (including contractors) who are or will be performing any tasks to identify all potential hazards and the best ways to eliminate or reduce risk.
2. Make sure you are aware of any high risk activities, work with new machinery or new work processes before they happen.
3. Understand the hazards associated with tasks you supervise and have risk controls in place before work starts. This could mean preventing work from being done while a safety issue is being resolved.
4. Take action to resolve health and safety issues as soon as possible. This includes escalating the issue to more senior management if necessary. Once agreement is reached on how to fix a problem, implement it as soon as possible.

1.2 Risks associated with identified hazards are determined in consultation with others and documented in accordance with compliance procedures.

Q2. Correctly match the appropriate Hazards & risks.

Workplace Hazard	Example of Hazard	Example of Harm Caused
------------------	-------------------	------------------------

Thing	Knife	Slips, falls
Substance	Benzene	Shock, electrocution
Material	Asbestos	Cut
Source of Energy	Electricity	Leukemia
Condition	Wet floor	Mesothelioma

Marking Guide+Answers 6 Marks

Workplace Hazard	Example of Hazard	Example of Harm Caused
Thing	Knife	Cut
Substance	Benzene	Leukemia
Material	Asbestos	Mesothelioma
Source of Energy	Electricity	Shock, electrocution
Condition	Wet floor	Slips, falls
Process	Welding	Metal fume fever
Practice	Hard rock mining	Silicosis

1.3

Provision is made to accommodate changes to documentation should unforeseen hazards be identified.

Q3. How do you do a risk assessment?

Marking Guide+Answers 6 Marks

To be sure that all hazards are found:

- Look at all aspects of the work.
- Include non-routine activities such as maintenance, repair, or cleaning.
- Look at accident / incident / near-miss records.
- Include people who work "off site" either at home, on other job sites, drivers, teleworkers, with clients, etc.
- Look at the way the work is organised or "done" (include experience and age of people doing the work, systems being used, etc).
- Look at foreseeable unusual conditions (for example: possible impact on hazard control procedures that may be unavailable in an emergency situation, power outage, etc.).
- Examine risks to visitors or the public.
- Include an assessment of groups that may have a different level of risk such as young or inexperienced workers, persons with disabilities, or new or expectant mothers.

Q4. If you are a driver, fill out the following risk assessment table

Risk Assessment				
Task	Hazard	Risk	Priority	Control
Delivering product to customers	Drivers work alone	May be unable to call for help if needed		
	Drivers have to occasionally work long hours	Fatigue, short rest time between shifts		
	Drivers are often in very congested traffic	Increased chance of collision		
		Longer working hours		
	Drivers have to lift boxes when delivering product	Injury to back from lifting, reaching, carrying, etc.		

Marking Guide+Answers 4 Marks

Risk Assessment				
Task	Hazard	Risk	Priority	Control
Delivering product to customers	Drivers work alone	May be unable to call for help if needed	High	Communication

	Drivers have to occasionally work long hours	Fatigue, short rest time between shifts	Low	Rostering
	Drivers are often in very congested traffic	Increased chance of collision	Medium	Adjustment of time to drive
		Longer working hours		
	Drivers have to lift boxes when delivering product	Injury to back from lifting, reaching, carrying, etc.	High	Safe lifting

2. Assign levels of risk and develop and document control measures.

2.1 Level of risk is assigned for each identified hazard in accordance with the regulations and following compliance procedures.

Activity (1)

By using the attached risk assessment chart, E137A 2.1, find out the risks that can occur in K2.11 High Power Electrical Workshop & rate the risks.

2.2 Control measures are developed for hazard, level of risk and activity to eliminate and/or mitigate the risk following compliance procedures.

Activity (2)

Based on the outcome of the risk, plan to control the hazards.

2.3 Hazard, level of risk and control measures are agreed to and documented in consultation with all involved in accordance with compliance procedures.

Activity (3)

Perform the group discussion to finalise the risk control documentation.

3. Monitor and review the control measures.

- 3.1 Documented control measures are made available for reference by all involved with the work.

Activity (4)

Prepare the risk control documentation & file in the locker.

- 3.2 Control measures are modified where required in consultation with all involved with the work in accordance with compliance procedures.

Activity (5)

The new machine will be installed in K2.11, modify your current risk control plan accordingly. Undergo the group discussion , finalize the updated document & submit it

- 3.3 Documentation of hazards, risk control measures and their application are filed in accordance with compliance procedures.

Activity (6)

Prepare the risk control documentation & file in the locker.

ASSESSMENT SCHEDULE

E108+E137+G106 are concurrently assessed.

Performance Criteria	Assessment 1 Practical		Assessment 2 Theory
	Continuous Observation	Written Assessment as part of Practical	Written Assessment
1.1		X	X
1.2		X	X
1.3	X		

2.1		X	X
2.2	X	X	
2.3	X		
3.1		X	
3.2		X	
3.3		X	
EKAS Assessment		X	X

ELECTRICAL TRADES REFERENCES

<https://www.iqytechnicalcollege.com/electricaltrade2022.htm>

Assessment Mapping - Template

(streamlined training package)

This template to be used for “new” endorsed streamlined training packages.

Instruction for use: These instructions in RED should be deleted from the completed document. Instructions in BLUE should be written over with appropriate information.

- This template is to be completed by the assessment developer to ensure the assessments meet the training package requirements for the unit of competency.
- It must be used during the assessment validation process.
- Record of this document must be retained in the faculty TAS teamshare teaching section.
- Add rows and columns as required below.

This document should be viewed concurrently with [UEENEEG063A- Assessment Mapping+Question+Marking Guide+Observation.pdf](#)

Click [HERE](#)

Faculty:		College:	
Teaching Section:	Electrical Engineering		
Qualification Number and Name:	UEE62122 Advanced Diploma of Engineering Technology-Electrical/ UEE62220 Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEEEL0080 Plan and analyse wiring systems, circuits, control and protection for electrical installations Part 1 Protection		

Copy and paste the following table for each element as required

Elements & Performance Criteria		Assessment event(s)			
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
1 Prepare to plan and analyse wiring systems	1.1	The scope and nature of the electrical installation is determined from job specifications		Practical 1 to 5 of UEENEEG063A- Assessment Mapping+ Question+ Marking Guide+ Observation (Page 1 to 3)	
	1.3	Cable routes, the route lengths of cable, and the conditions in which the wiring system is to operate is determined from job specifications or from consultation with appropriate people	Q 1 to 7 of UEENEEG063A- Assessment Mapping+ Question+ Marking Guide+ Observation (Page 4 to 6)		
	1.2	Load requirements for individual current using equipment are determined from job specifications and/or consultation with appropriate people		Practical 6 of UEENEEG063A- Assessment Mapping+ Question+ Marking Guide+ Observation (Page 6)	

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
2 Evaluate and plan electrical circuits, control and protection	2.1	Circuits, control and protective devices are planned to ensure safe and functional operation of the installation and to comply with relevant requirements		Practical 7 to 10 of UEENEEG063A- Assessment Mapping+ Question+ Marking Guide+ Observation (Page 7 to 9)	
	2.2	Earthing is planned to comply with the multiple earthed neutral (MEN) system requirements		As above	
	2.3	Protective devices are selected to meet the required switching and tripping currents, coordination and discrimination for overload and short circuit protection in accordance with relevant industry technical standards		As above	
	2.4	Residual current devices (RCDs) are planned to meet the required circuit switching and tripping currents, in accordance with relevant industry technical standards		As above	
	2.5	Switchgear/control gear is planned to meet current and voltage requirements and confirmed suitable for environmental conditions (ingress protection (IP) ratings) and functional requirements		As above	
	2.6	Switchboards are planned to accommodate control and protective devices, links, safety services and other distributor equipment in accordance with relevant industry technical standards		Practical 11 to 15 of UEENEEG063A- Assessment Mapping+ Question+ Marking Guide+ Observation (Page 10 to 13)	

Elements & Performance Criteria		Assessment event(s)			
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
4.Document electrical installation wiring systems, circuits, control and protection	3.1	Document electrical installation wiring systems, circuits, control and protection		Practical 16 of UEENEEG063A- Assessment Mapping+ Question+ Marking Guide+ Observation (Page 14)	
	3.2	Manufacturer data is referenced in planning of equipment to ensure materials comply with safety requirements and relevant industry standards	Test 1 G033+G063 Question + Marking Guide 1 All Questions		
	3.3	Electrical installation arrangement and specifications for all items are documented (Protection)	Test 1 G033+G063 Question + Marking Guide All Questions		

Add rows to the following table as required

Performance Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
<Insert performance evidence >	Insert question number or task skill number from assessment tool that address the specific, performance evidence.	Insert question number or task skill number from assessment tool that address the specific, performance evidence.	Insert question number or task skill number from assessment tool that address the specific, performance evidence.
Connection of meter		Practical 1	
Connection of transformers in three phase system		Practical 2	
Home electrical wiring system model- Investigating the connection		Practical 3/4	

Performance Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Supply switch board meter connection points		Practical 5	
Hazardous assessment/ Risk assessment/ Safety Practice	Q 1 to 7 of UEENEEG063A- Assessment Mapping+ Question+ Marking Guide+ Observation (Page 4 to 6)		
Home wiring supply RCD Connection		Practical 7	
Wiring circuit testing		Practical 8/9/10	
Electrical Wiring Protection System		Practical 11/12/13	
Control Wiring -Motor Starter		Practical 14/15	
Specification collection			Practical 16 Assignment work

Add rows to the following table as required

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
<Insert knowledge evidence >	Insert question number or task skill number from assessment tool that address the specific, knowledge evidence.	Insert question number or task skill number from assessment tool that address the specific, knowledge evidence.	Insert question number or task skill number from assessment tool that address the specific, knowledge evidence.

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T1 Safety principles to which electrical systems	Q 1 to 7 of UEENEG063A- Assessment Mapping+ Question+ Marking Guide+ Observation (Page 4 to 6)		
T2 Circuit and control arrangements		Practical 1 to 5	
T3 Hazards and risks in an electrical installation	Q 1 to 7 of UEENEG063A- Assessment Mapping+ Question+ Marking Guide+ Observation (Page 4 to 6)		
T4 Protection against indirect contact	Test 1 G033+G063 Question + Marking Guide 1 Part A Q4+5+7		
T5 Earthing	Test 1 G033+G063 Question + Marking Guide 1 Part A Q 15+16	Practical 11/12/ 13	
T6 Protection against overload and short circuit	Test 1 G033+G063 Question + Marking Guide 1 Part B Q4		

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T7 Devices for automatic disconnection of supply	Test 1 G033+G063 Question + Marking Guide 1 Part B Q8		
T8 Protection against over voltage and under voltage	Test 1 G033+G063 Question + Marking Guide 1+ Part A Q 10 + Test 2 G033+G063 Question + Marking Guide 2+ Q 2		
T9 Control of an electrical installation and circuits	Test 2 G033+G063 Question + Marking Guide 2+ Q 1		
T10 Switchboards / distribution boards	Test 2 G033+G063 Question + Marking Guide 2+ Q 1		

Add rows to the following table as required

Assessment Conditions	Assessment event 1 Written Test	Assessment event 2 Practical &	Assessment event 3 Assignment
-----------------------	------------------------------------	-----------------------------------	----------------------------------

		Observation	
Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the welectrical workshop K2.11. Application of safe working practice & regarding the housekeeping rules are to be observed. Emergency procedures are to be informed. Safety equipments & first aids equipments are to be available. The students get the access to <ul style="list-style-type: none"> Relevant practical equipments Records relating to electrical engineering resources 	Test 1 + 2	Practical 1 to 16	

Created by (Name)	U Kyaw Naing (Joe)	Date created	16 August 2016
Approved by (Name)		Date approved	
Signature		Date modified	

UEENEEG063A Arrange circuits, control and protection for general electrical installations

ASSESSMENT QUESTIONS & TESTS ARE BASED ON THE FOLLOWINGS, THEY ARE MODIFIED, EXTRACTED SOME PARTS, APPLIED THE SIMILAR ONES, ALTER AND UTILIZED IN ASSESSMENT TASKS & THEORY TESTS FROM TIME TO TIME.

The following assessments questions are arranged in Test 1 & 2

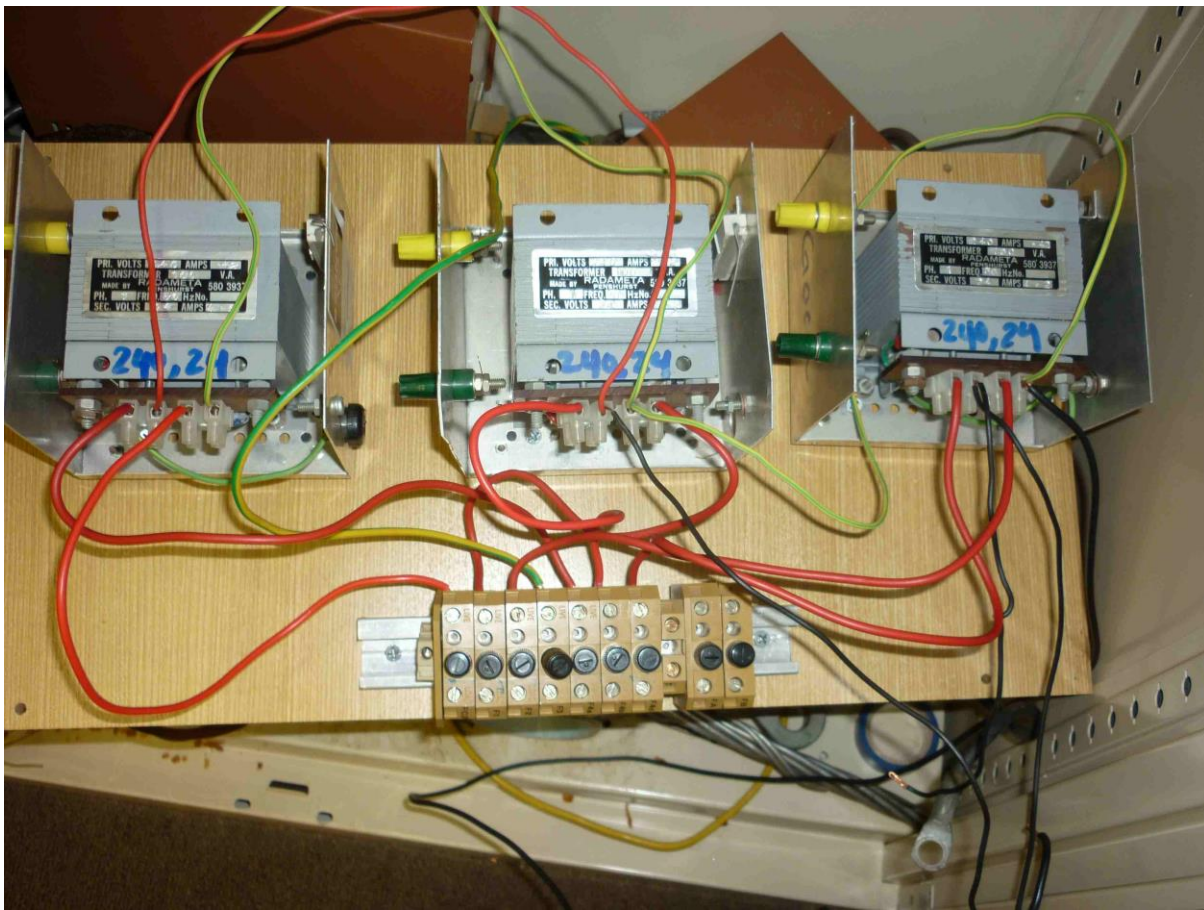
1 Prepare to arrange electrical installations circuits, control and protection

1.1 The extent and nature of the electrical installation is determined from job specifications.

Determine the appropriate equipments to do the following tasks

Practical 1 to 5- Students' performances in the practicals are assessed.







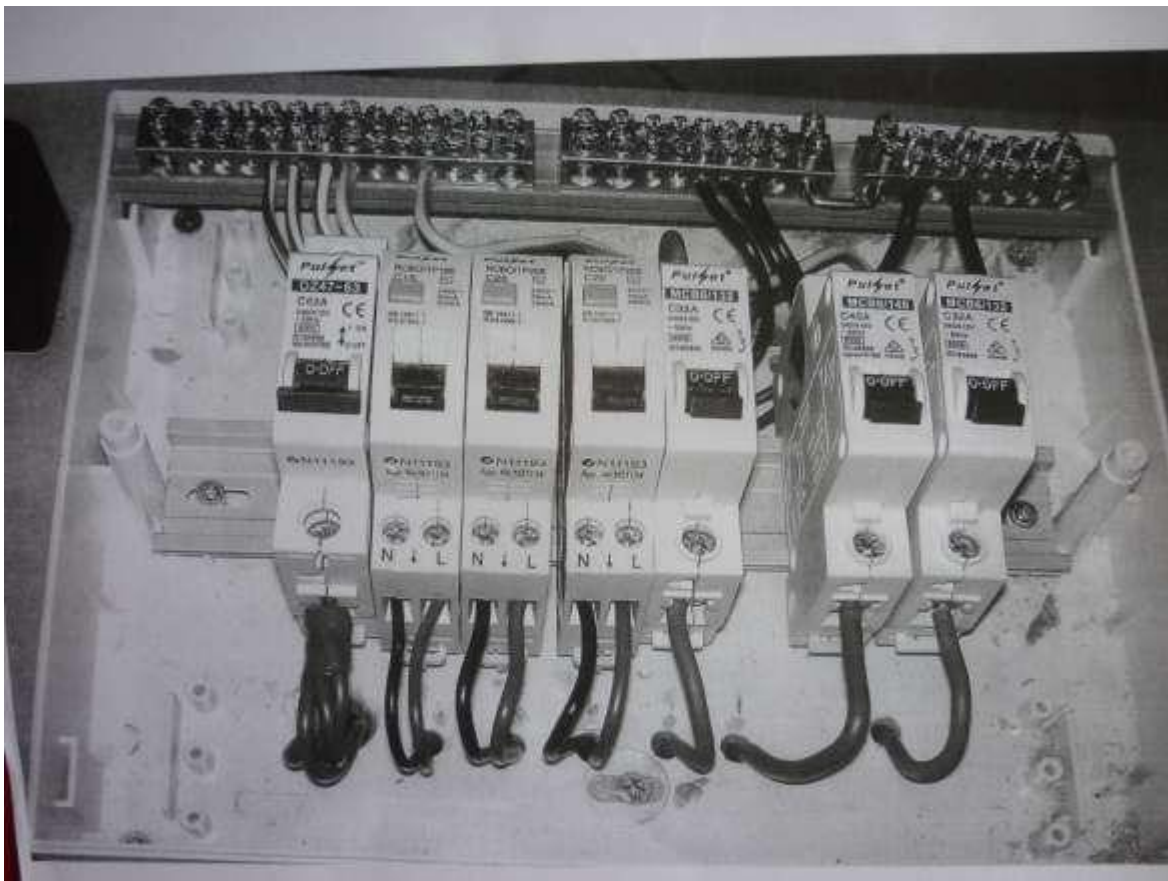
STUDENTS DESIGN
PROJECT

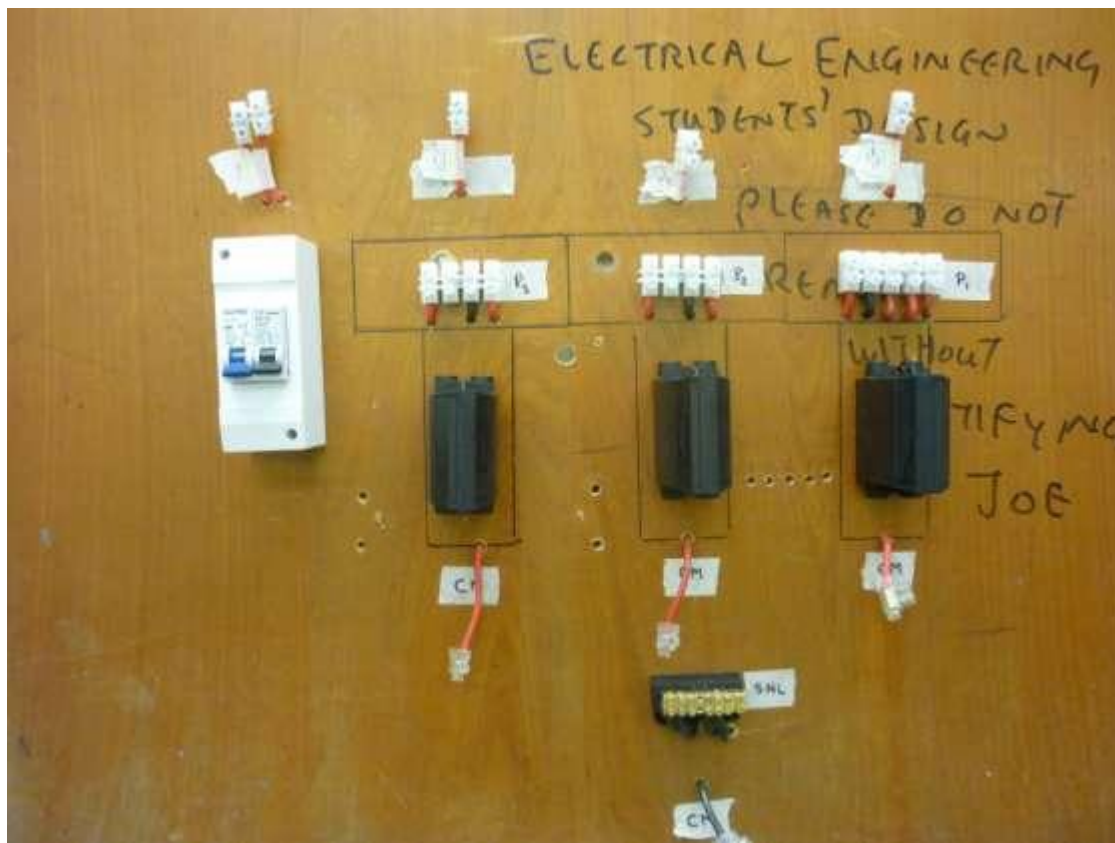
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ELECTRICAL ENGINEERING
(IN 42-11)

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JLF

Engineering Department
FACULTY





Theory knowledge

1.2 Safety and other regulatory requirements to which the electrical installation shall comply are identified, obtained and understood.

Q1 Interpret the following symbols (4 marks)



Answer+Marking Guide—Each 1 mark

Eye Safety Glass must be worn

Biochemmical Hazard warning

Electrical Hazard

Head Protection must be worn

[Practical Action](#)

[Questions](#)

Q2 Who can hold a WHS entry permit?

Q3 Who can hold a Fair Work entry permit?

Q4 Who is Fit & proper person?

[ANSWER & MARKING GUIDE Each 2 marks](#)

Who can hold a WHS entry permit

Under the *Work Health and Safety Act 2011* (the WHS Act) a permit holder must be:

- an elected officer of the union, or
- an employee of the union,

And must:

- have satisfactorily completed prescribed training, and
- hold an entry permit under the *Fair Work Act 2009* (the Act).

Who can hold a Fair Work entry permit

Under the Act a permit holder must be:

- an elected officer of the union, or
- an employee of the union, and
- a fit and proper person to hold a Fair Work entry permit, as determined by the Fair Work Commission.

Fit & proper person

The Delegate of the Commission must be satisfied that the proposed permit holder is a 'fit and proper person' before a Fair Work entry permit can be issued. Section 513 of the Act details criteria for assessing whether a proposed permit holder is a 'fit and proper person' to hold a permit.

Practical Action 2 marks

Questions

Q5. You are a project manager of the worksite, provide your instruction to your workers to fill the attached ESH Thresold Review form.

Questions

Q5. If you want to lift a heavy item, what steps will you follow? (2 marks)

Answer

Do not bend the back.

Bend the kneel.

Hold the item with two hands.

Place the body upright.

Lift them by using kneel force

Q6. What are the risk assessment process in disconnecting & re-connecting of electrical equipments? (2 marks)

Answer+Marking Guide

Risk assessments must be based on relevant factors including:

- Operating and storage environment;
- Usage (particularly the movement of the equipment and flexing of the supply cord);
- Equipment / characteristics (function, make and model);
- Experience with the equipment;
- Age of the equipment;
- Electrical safety knowledge of typical users; and
- Previous inspection and testing results.

Q7. Write down the procedure to connect an electric motor to power supply.

Answer+Marking Guide

- Check motor rating, voltage and current by looking at the nameplate
- Check the type of motor whether AC or DC
- Measure supply voltage by meter.
- Test motor insulation resistance by megger
- Check any damage on body.
- Check the terminal / plug
- Use insulation glove to handle the motor.
- Join the supply.
- Observe noise and vibration of the motor

1.3 Load requirements for individual current-using

equipment is determined from job specifications
or from consultation with appropriate persons.

The students are asked to do Maximum demand calculation of K2.11 & record the ratings of equipments Practical activity 6

Students' performance is assessed

2 Arrange electrical
installations circuits,
control and protection

2.1 Circuits, control and protective devices are arranged to ensure safe and functional operation of the installation and to comply with technical standards and job specifications and requirements.

2.3 Earthing is arranged and terminated to comply with the MEN system requirements.

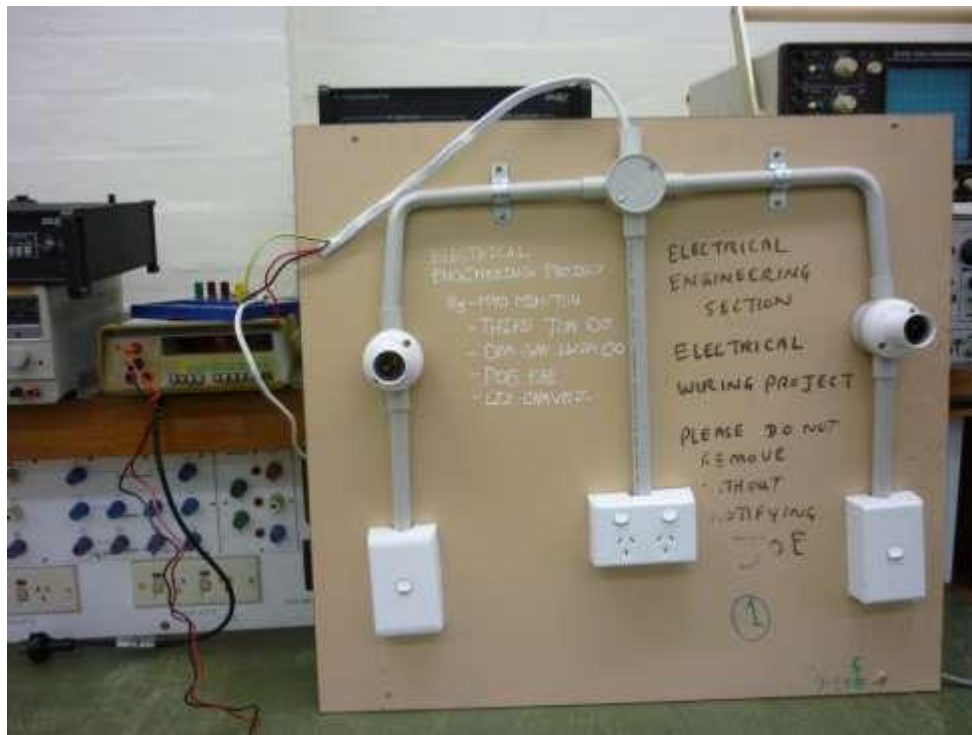
2.4 Protective devices are selected to meet the required switching and tripping currents, co-ordination and discrimination for overload and short-circuit protection.

2.5 Residual current devices are selected to meet the required circuit, switching and tripping currents required.

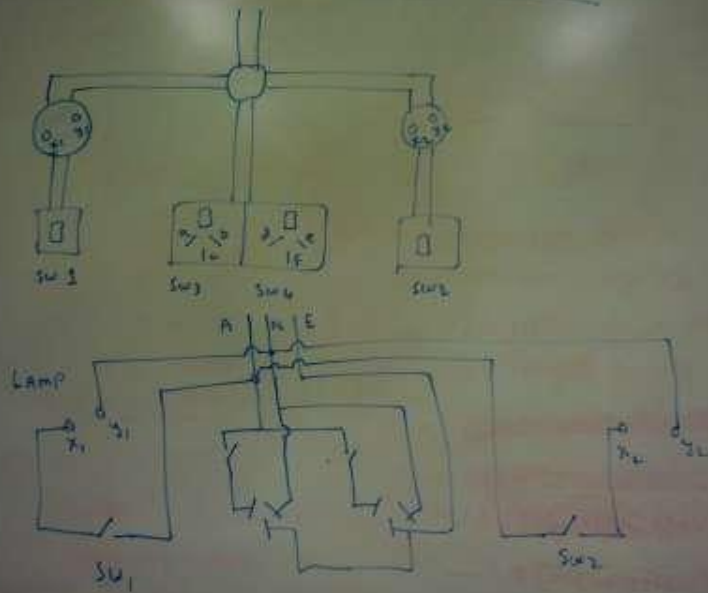
2.6 Switchgear/control gear is selected to meet current, voltage and IP ratings and functional requirements.

Installation of the following circuit control equipments are to be assembled by the students & their performances are assessed. Practical 7 to 10

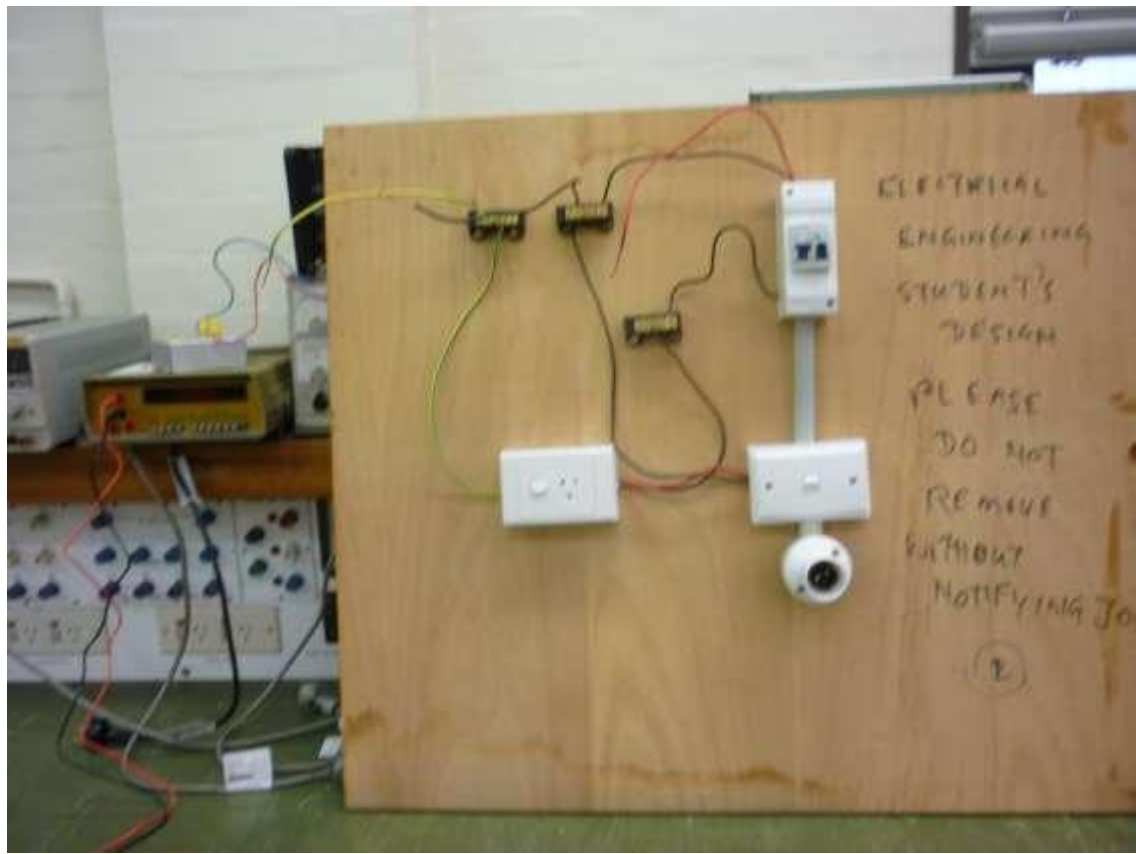


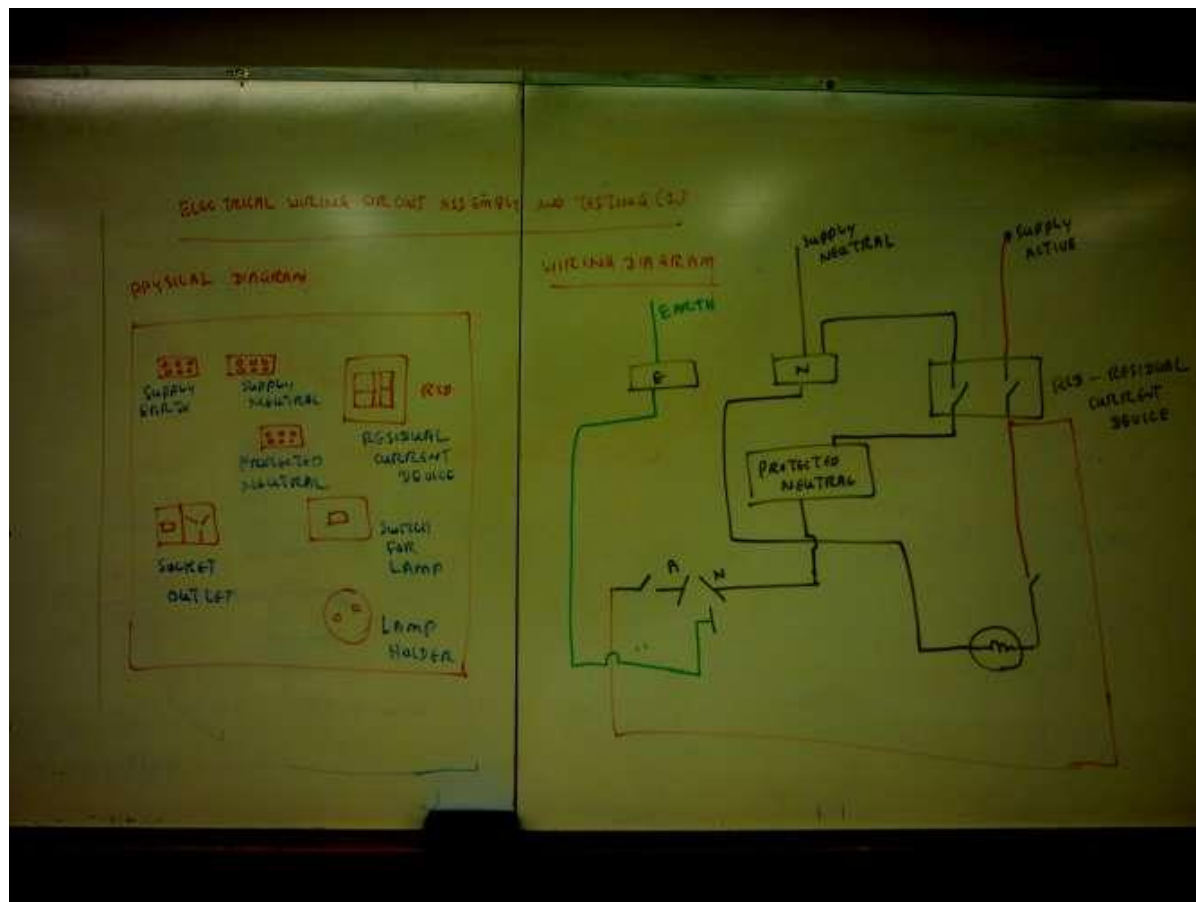


ELECTRICAL WIRING CIRCUIT ASSEMBLY AND TESTING (1)



- PROCESSES
1. CIRCUIT SET
 2. SWITCH 2
- SW1 ON
- SW1 OFF
- SWITCH 2
- SW2 ON
- SW2 OFF





2.7 Switchboards are arranged to accommodate control and protective devices, links, safety services, and other distributor equipment in accordance with requirements. Perform the following circuit testing & students' practical performance is assessed.

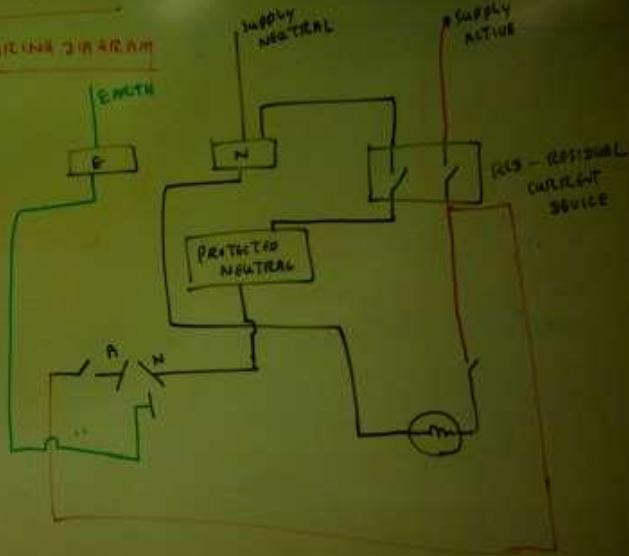
Practical 11 to 15

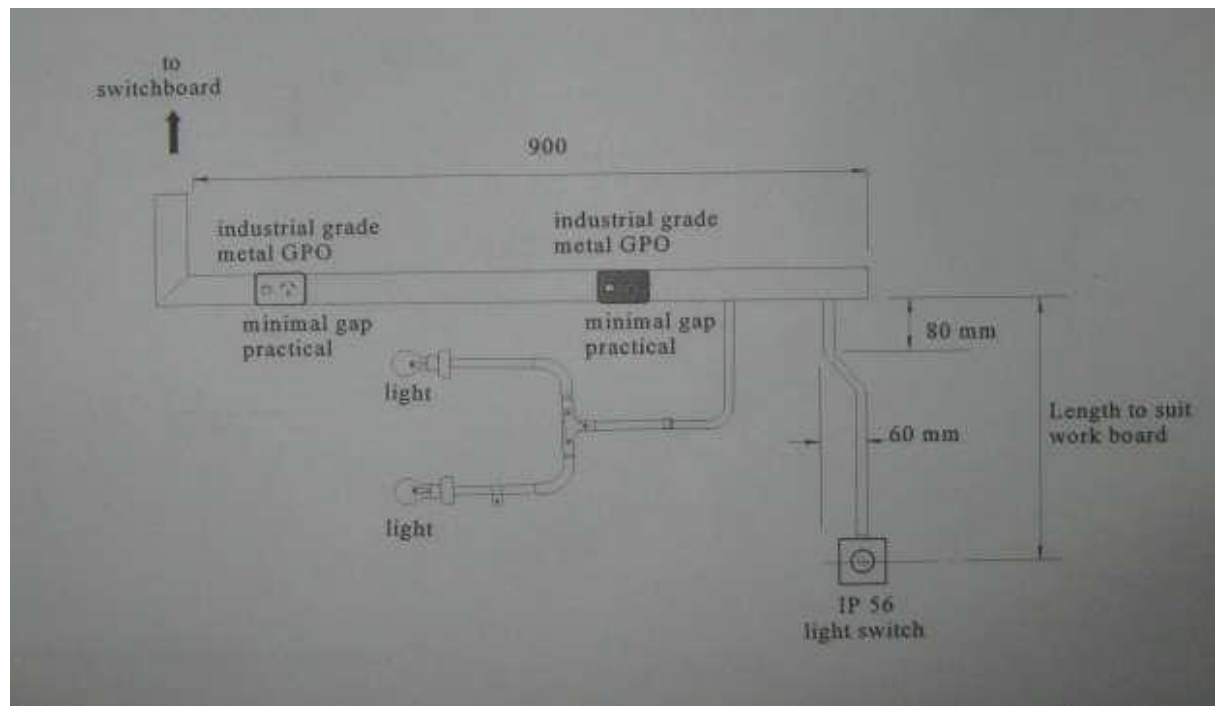
ELECTRICAL WIRING FOR OUT RESIDUAL AND TESTING (2)

PHYSICAL DIAGRAM



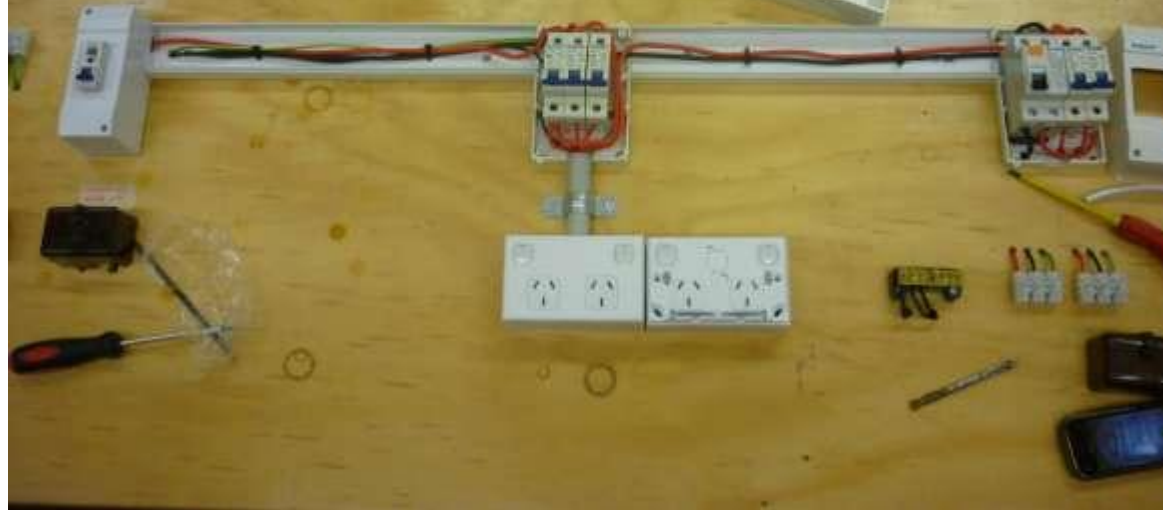
WIRING DIAGRAM





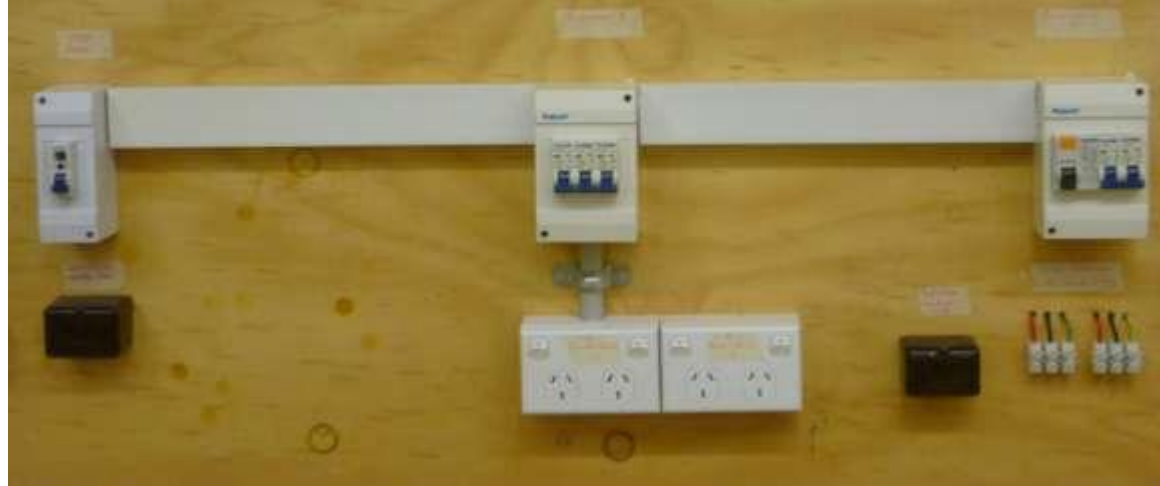
ELECTRICAL ENGINEERING
STUDENT'S PROJECT

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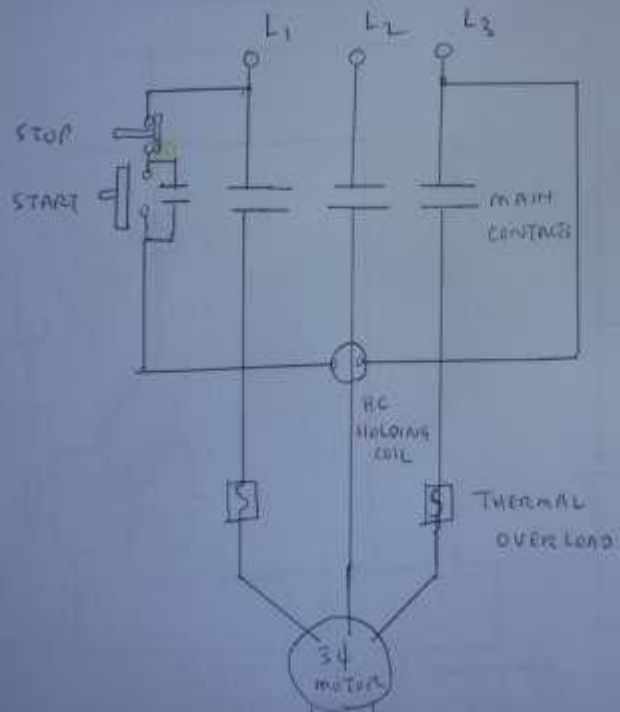


ELECTRICAL ENGINEERING
STUDENTS' PROJECT

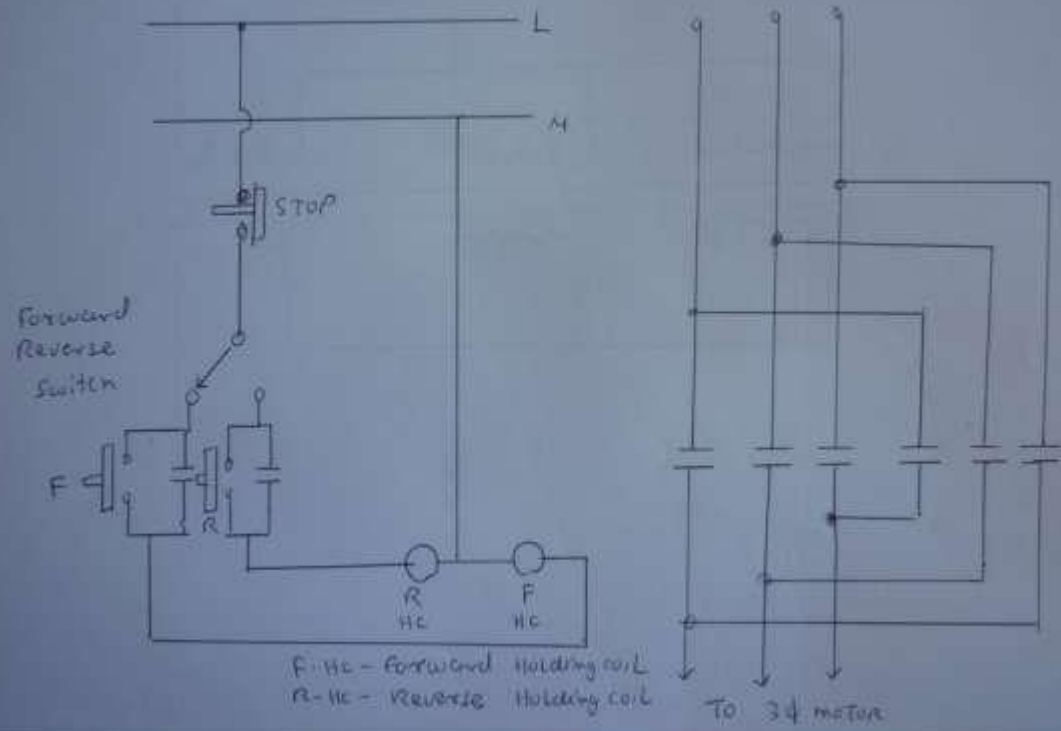
PLEASE DO NOT REMOVE
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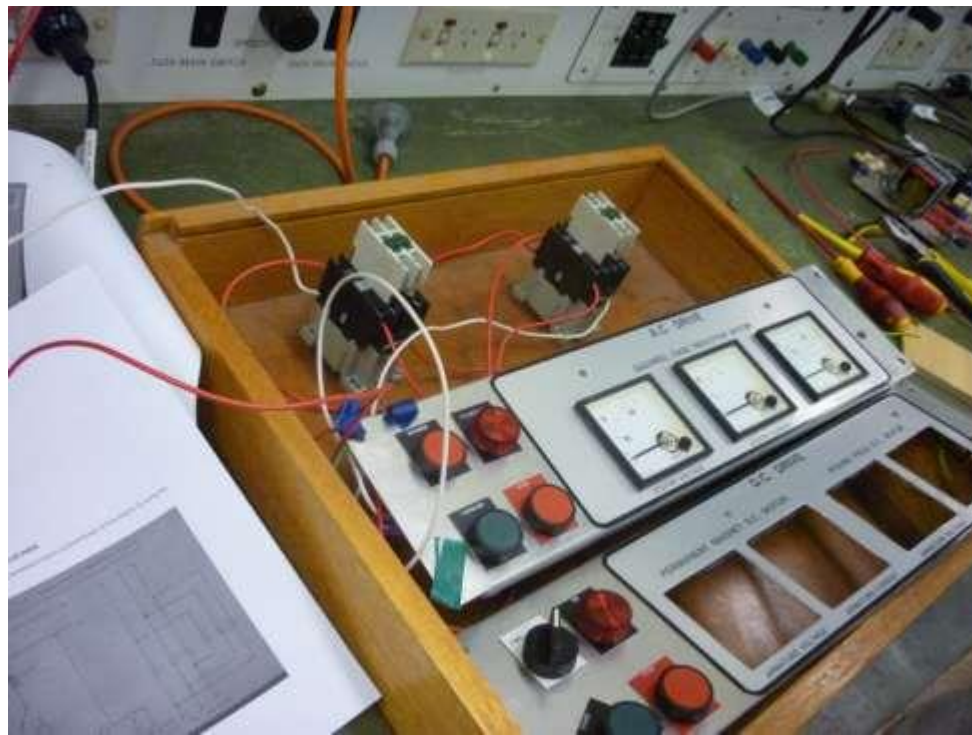


Practical (9) motor control



PRACTICAL (10) FORWARD / REVERSE MOTOR





3 Document electrical installation circuits, control and protection arrangements

3.1 Evidence is obtained from manufacturers/suppliers that electrical equipment selected complies with safety requirements.

Practical 16

The students are instructed to collect the specifications related to usage of equipments from manufacturers.

PRACTICALS

www.electricaldiploma2013.webs.com

Study Option (1)

Guided study (Online)Resources+Online exercises+Online Practicals

Click [HERE](#)

Then the students are instructed to download the followings resources to get the specifications

[Stage 1 Electrical Workshop Update](#)

[Stage 1 Electrical Workshop](#)

[Advanced Wiring Download Link](#)

[Stage 1 to 3 Practicals](#)

[Electrical Machine Practicals](#)

[Electrical Wiring Equipment](#)

Estimating & specification preparation practice is assessed.

3.2 Reasons for selections made, including calculations, are documented in accordance with established procedures.

3.3 Electrical installation arrangement and specifications for all selected items are documented in accordance with established procedures and forwarded to appropriate person(s).

Assessment Test 1-

SAG Sem 2-2016-U Kyaw Naing (Joe)/ASSESSMENT MAPPING Sem 2-2016/G033 Assessment Mapping/G033+G063 Question + Marking Guide 1

The students' performance is assessed by test.

Location of Evidences (Table 1)

Performance Criteria	Above	Location of Evidences
Marking Guide/ Assessment Cover/		

Feedback own record		
Students' work in own record	Summative Assessment- Formal Tests	
	Formative Assessment/Practical+ Class works	
Marking Guide to be presented for audit		In attached USB/DVD/CD Attached Some documents in team share UEE11-1.5 Printed documents
Students' work to be presented for audit		In attached USB/DVD/CD Attached Some documents in team share UEE11-1.5 Printed documents

EKAS	Assessment
<p>KS01-EG063A Electrical installations — arrangement, control and protection</p> <p>Evidence shall show an understanding of circuit arrangements, control and protection of electrical installations that comply with the Wiring Rules and Service Rules to an extent indicated by the following aspects:</p> <p>T1 Safety principles to which electrical systems in building and premises shall comply.</p> <p><input type="checkbox"/> Safety principles are given in Part1 (Section 1) of the Wiring Rules AS/NZS 3000</p>	<p>Test 1 & Test 2</p> <p>Online Practical Support</p> <p>https://www.highlightcomputer.com/electricaldiploma2018.htm</p> <p>G033+G063+G107 (Week 1 to 6 Lessons)(G033)</p> <p>G063 Wk 7+8</p> <p>G033 Hot Water System</p>

with deemed-to-comply requirements given in Sections 2 to 8.

Compliant methods for providing protection - include those for providing protection against direct and indirect contact; thermal effects; unwanted voltages; overcurrent; fault currents; overload; overvoltage; injury from mechanical movement.

Requirements for installation design and selection of equipment - includes compliant protection arrangements; correct functioning; compatibility with supply; estimation of maximum demands; voltage drop considerations; arrangement of circuits and the like

T2 Circuit and control arrangements encompassing:

reason for dividing electrical installations into circuits

factors that shall be considered in determining the number and type of circuits required for an installation.

daily and seasonal demand for lighting power, heating and other loads in a given installation.

number and types of circuits required for a particular installation.

diagrams/schedules of circuits for given installations.

application and arrangements of SELV and PELV circuits

application and arrangement of an isolated supply

T3 Hazards and risks in an electrical installation encompassing:

effects on the human body of various levels of

[G106 Cable Termination \(UG Cable\)](#)

[G106 Cable Termination](#)

[G106+G033 Practical](#)

[G033+G063+G107 Week 10 to 15](#)

[Youtube Videos for Electrical Engineering Lessons](#)

[Australian Electrician Training](#)

[AS3000](#)

[AS3000:2016](#)

[AS3008](#)

[NSW Electrical Services Rule](#)

[Electrician Capstone unit](#)

[Electrician Capstone Test Old Questions](#)

[Electrician Capstone Unit Study Guide.zip](#)

Online practical Work performance practical PLUS Online reference resources are provided to the students to acquire the competencies needed in this unit

a.c. and d.c. current and duration of current flow for various current paths.

risk of ignition of flammable materials due the thermal effects of current or electric arcs in normal service of an electrical installation.

risk of injury from mechanical movement of electrically actuated equipment.

Protection against direct contact (basic protection)

acceptable methods

use of extra-low voltage

T4 Protection against indirect contact encompassing:

indirect contact with live parts of an electrical installation may occur.

methods and devices that comply with the Wiring Rules for providing protection against indirect contact.

components of the 'automatic disconnection of supply' method of protection against indirect contact.

the terms 'touch voltage' and 'touch current'.

the current path when a short circuit fault to exposed conductive parts of an appliance occurs.

protection against indirect contact is by the use of Class II equipment and by electrical separation.

additional protection by use of Residual Current Devices (RCDs)

protection against indirect contact by use of extra-low voltage and electrical separation.

Protection requirements for damp situations.

T5 Earthing encompassing:

- the terms: earthed, earthed situation, earth electrode, equipotential bonding, multiple earthed neutral (MEN) system, protective earth-neutral (PEN) conductor, main earthing conductor, protective earthing (PE) conductor, functional earthing, MEN link.
 - selection of minimum size-earthing conductor for a range of active conductor sizes and materials.
 - parts of an earthing system and the purpose of each.
 - typical arrangement for a MEN earthing system.
 - arrangements of protective earthing conductors that comply with the Wiring Rules.
 - requirements for equipotential bonding in a range of installation situations.
 - Installation of a MEN earthing system for a single phase installation
- T6 Protection against overload and short circuit current encompassing:
- overload current or fault currents in an electrical installation.
 - equivalent circuit of an earth fault-loop
 - level of fault current possible at a given point in an installation from the fault-loop impedance and data from the electricity distributor.
 - methods and devices that comply with the Wiring Rules AS/NZS 3000 for providing protection against the damaging effects of overload and fault current
 - requirements for co-ordination between protective devices and conductors
- requirements for co-ordination of protection devices for discrimination and back-up

protection.

T7 Devices for automatic disconnection of supply encompassing:

- operating principles of thermal/magnet circuit breakers.
- operating principles of common types of fuses.
- operating principles of residual current devices (RCD).
- time/current curves tripping characteristics of various types of circuit breakers that comply with the requirements of the Wiring Rules.
- time/current curves fusing characteristics of various types of fuses that comply with the requirements of the Wiring Rules.
- time/current curves tripping characteristics of various types of RCDs that comply with the requirements of the Wiring Rules.
- factors in a fault loop that will affect the impedance of the circuit.
- maximum impedance of an earth fault-loop to ensure operating of a protection device.
- selecting a fuse for fault current limiting protection.
- drawing switchboard wiring arrangements of 2-pole RCDs, 4-pole RCDs, combination RCD/MCBs.

T8 Protection against over voltage and under voltage encompassing:

- causes of over voltage and how this may affect the electrical system.
- methods for protection against over voltage.
- causes of under voltage and how this may affect the electrical system.
- methods for protection against under voltage.

<p>T9 Control of an electrical installation and circuits encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> switch types, current and voltage ratings and IP rating and where these apply. <input type="checkbox"/> switching requirements for isolation, emergency, mechanical maintenance and functional control. <input type="checkbox"/> control arrangement for complete installations with and without safety services and an alternative supply. <p>T10 Switchboards / distribution boards encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Purpose, types and applications. <input type="checkbox"/> Physical and circuit arrangements for whole current and CT metering. <input type="checkbox"/> Physical and circuit arrangements of main switches, circuit protection devices, fault-current limiters and metering equipment and other distributor equipment. <input type="checkbox"/> compliance requirements (includes location and access, arc fault protection, identification, construction suitability, equipment marking, wiring, fire protection and arc-fault protection). 	
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Location of Evidences (Table 1)

ASSESSMENT SCHEDULE

G033+G063 are concurrently assessed.

Performance Criteria	Assessment 1 Practical		Assessment 2 Theory
	Continuous Observation	Written Assessment as part of Practical	Written Assessment
1.1		X	X
1.2		X	X

1.3	X		
1.4	X		
1.5	X		
1.6	X		
1.7	X		
2.1	X		
2.2	X		
2.3	X		
2.4	X		
2.5	X		
2.6	X		
2.7		X	X
3.1	X		
3.2	X		
3.3			X
3.4			X
EKAS Assessment		X	X

ELECTRICAL TRADES REFERENCES

<https://www.iqytechnicalcollege.com/electricaltrade2022.htm>

Assessment Mapping - Template

(streamlined training package)

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Click [HERE](#)

Faculty:	Construction, Engineering & Transport (CET)	College:	Ultimo
Teaching Section:	Electrical Engineering		
Qualification Number and Name:	UEE62111 Advanced Diploma of Engineering Technology-Electrical/ UEE62211 Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEEEL0080 Plan and analyse wiring systems, circuits, control and protection for electrical installations Part 2		

Copy and paste the following table for each element as required

Elements & Performance Criteria		Assessment event(s)			
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
3. Plan wiring systems and cables for general electrical installations	3.1	<p>Wiring system is planned and suitable for the environments in which it will operate</p> <p>Cable routes, the route lengths of cables and the conditions in which the wiring system is to operate is determined from job specifications or from consultation with appropriate persons</p> <p>Wiring systems are selected for suitability for the environments in which they are to operate</p>	<p>Q 1 to 7 of UEENEEG107A- Assessment Mapping+Question+ Marking Guide+ Observation.pdf Page 6 to 7</p>	<p>Practical 1 to 5 of UEENEEG107A- Assessment Mapping+Question+ Marking Guide+ Observation.pdf Page 1 to 5</p> <p>Practical 1 to 5 of UEENEEG107A- Assessment Mapping+Question+ Marking Guide+ Observation.pdf Page 1 to 5</p> <p>Practical 7 to 10 of UEENEEG107A- Assessment Mapping+Question+ Marking Guide+ Observation.pdf</p>	

Elements & Performance Criteria		Assessment event(s)			
Element(s)	PC No	Performance Criteria (PC)	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
				Page 9 to 13	
	3.2	Cable conductor sizes are planned to meet current carrying capacity requirements and voltage drop and earth fault loop impedance limitations in accordance with relevant industry standards		Practical 7 to 10 of UEENEEG107A- Assessment Mapping+Question+ Marking Guide+ Observation.pdf Page 9 to 13	
	3.3	Circuit protective devices are planned to meet requirements for co-ordination with conductor current carrying capacity in accordance with relevant industry		As above	
	3.4	Earthing system components are planned to meet multiple earthed neutral (MEN) system in accordance with relevant industry standards		As above	
4.Document electrical installation wiring systems, circuits, control and protection	4.2	Manufacturer data is referenced in planning of equipment to ensure materials comply with safety requirements and relevant industry standards		Practical 16 of UEENEEG107A- Assessment Mapping+Question+ Marking Guide+ Observation.pdf Page 13	
	4.1	Rationale for device and wiring system planning and calculations are documented	Test 1 Q1 to 5		
	4.3	Electrical installation arrangement and specifications for all items are documented	Test 2 Q1 to 15		

Add rows to the following table as required

Performance Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Main, Sub-main & Distribution Board Wiring		Practical 1 to 5	

Performance Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
OHS Practice	Q 1 to 7 of UEENEEG107A- Assessment Mapping+Question + Marking Guide+ Observation.pdf Page 6 to 7		
Wiring system, Cable selection, Circuit protective devices, Earthing system	Test 1 Q1 to 5 Test 2 Q1 to 15	Practical 7 to 10 of UEENEEG107A- Assessment Mapping+Question + Marking Guide+ Observation.pdf Page 9 to 13	
Specifications related to usage of equipments		Practical 16 of UEENEEG107A- Assessment Mapping+Question + Marking Guide+ Observation.pdf Page 9 to 13	

Add rows to the following table as required

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T1 Performance requirements - design and safety	Q 1 to 7 of UEENEEG107A- Assessment Mapping+Question + Marking Guide+ Observation.pdf Page 6 to 7		
T2 Final subcircuit arrangements		Practical 1 to 5 of UEENEEG107A- Assessment Mapping+Question + Marking Guide+ Observation.pdf Page 1 to 5	
T3 Factors affecting the suitability of wiring systems	Test 1 Q1 to 5 Test 2 Q1 to 15	Practical 7 to 10 of UEENEEG107A- Assessment Mapping+Question + Marking Guide+ Observation.pdf Page 9 to 13	
T4 Maximum demand on consumer's mains/submains	Test 1 Q1 , 2		
T5 Cable selection based on current carrying capacity T6 Cable selection based on voltage drop requirements T7 Cable selection based on fault loop impedance	Test 1 Q4 Test 2 Q2,3,10,15		
T8 Selecting protection devices	Test 2 Q6,14		
T9 Selecting devices for isolation and switching	Test 2 Q1,6,7,8,9		

Knowledge Evidence	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
T10 Switchboards	Test 2 Q6	Practical 7 to 10 of UEENEEG107A- Assessment Mapping+Question + Marking Guide+ Observation.pdf Page 9 to 13	

Add rows to the following table as required

Assessment Conditions	Assessment event 1 Written Test	Assessment event 2 Practical & Observation	Assessment event 3 Assignment
Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the welectrical workshop K2.11. Application of safe working practice & regarding the housekeeping rules are to be observed. Emergency procedures are to be informed. Safety equipments & first aids equipments are to be available. The students get the access to <ul style="list-style-type: none"> • Relevant practical equipments • Records relating to electrical engineering resources 	Test 1 + 2	Practical 1 to 16	

Created by (Name)	U Kyaw Naing (Joe)	Date created	16 August 2016
Approved by (Name)		Date approved	
Signature		Date modified	

UEENEEG107A Select wiring systems and cables for low voltage general electrical installations

ASSESSMENT QUESTIONS & TESTS ARE BASED ON THE FOLLOWINGS, THEY ARE MODIFIED, EXTRACTED SOME PARTS, APPLIED THE SIMILAR ONES, ALTER AND UTILIZED IN ASSESSMENT TASKS & THEORY TESTS FROM TIME TO TIME.

The following assessments questions are arranged in Test 1 & 2

1 Prepare to select wiring systems and cables for general electrical installation

1.1 The extent and nature of the electrical installation is determined from job specifications.

1.3 Cable routes, the route lengths of cables and the conditions in which the wiring system is to operate is determined from job specifications or from consultation with appropriate persons.

For 1.3, cable route length in the following installations are to be determined & installation conditions such as installation in air-unenclosed/ enclosed, under ground unenclosed/ enclosed are determined and the appropriate size of electrical cables are selected by applying AS3008 Cable Selection Rule

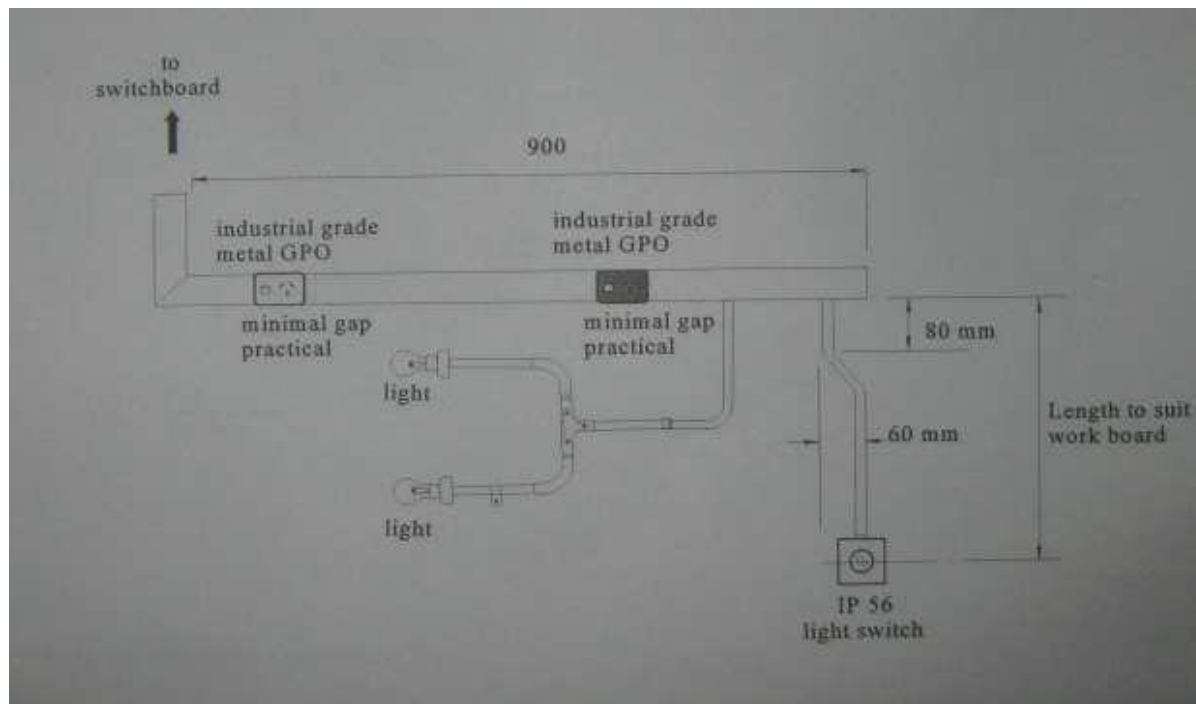
Determine the appropriate equipments to do the following tasks

Practical 1 to 5- Students' performances in the practicals are assessed.

Modification of design diagram to do the actual assembly

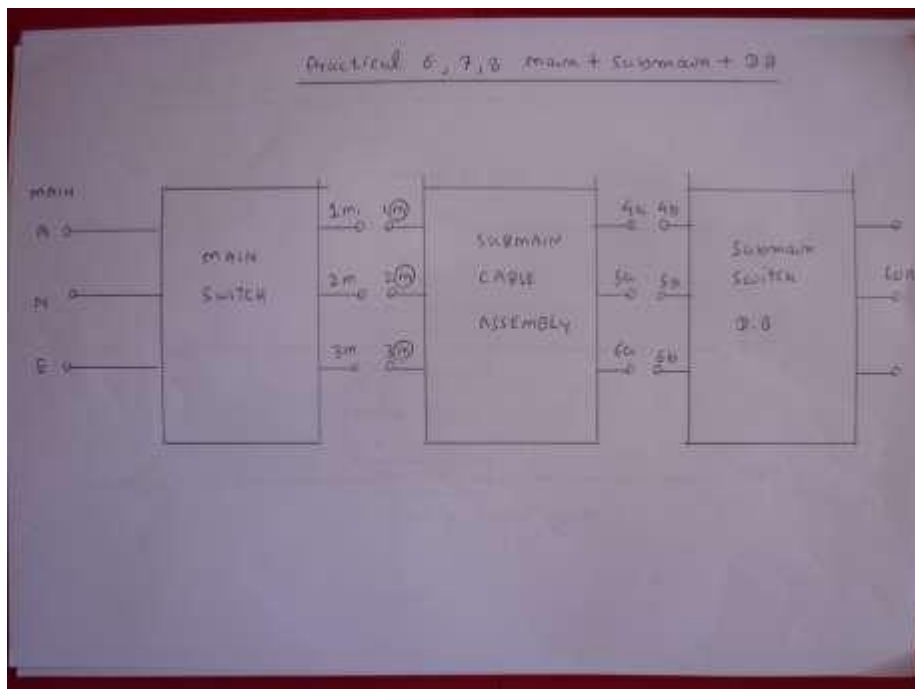
Trace the following wiring assembly on the given wiring board. The given drawing is just an outline.

The actual assembly is different from it. Sketch the actual assembly diagram & circuit diagram.



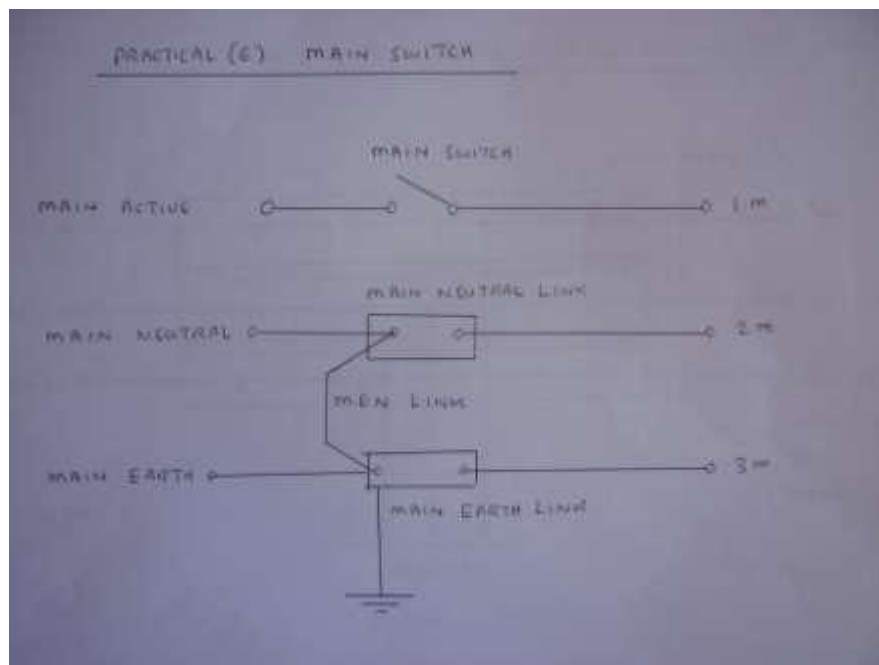
Main, Sub-main & Distribution Board Wiring

Wire the main, sub-main and distribution board wiring by using the following circuit diagrams (OR)
Trace the circuit & draw the circuit diagram.



Main

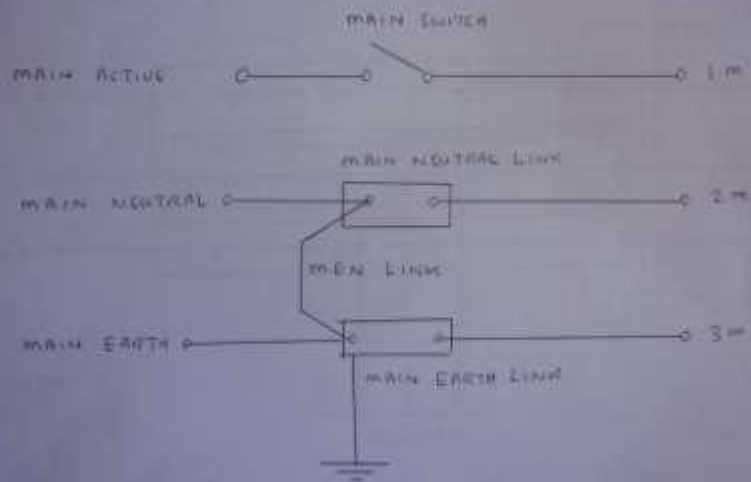
Wire the main board wiring by using the following circuit diagrams (OR) Trace the circuit & draw the circuit diagram.



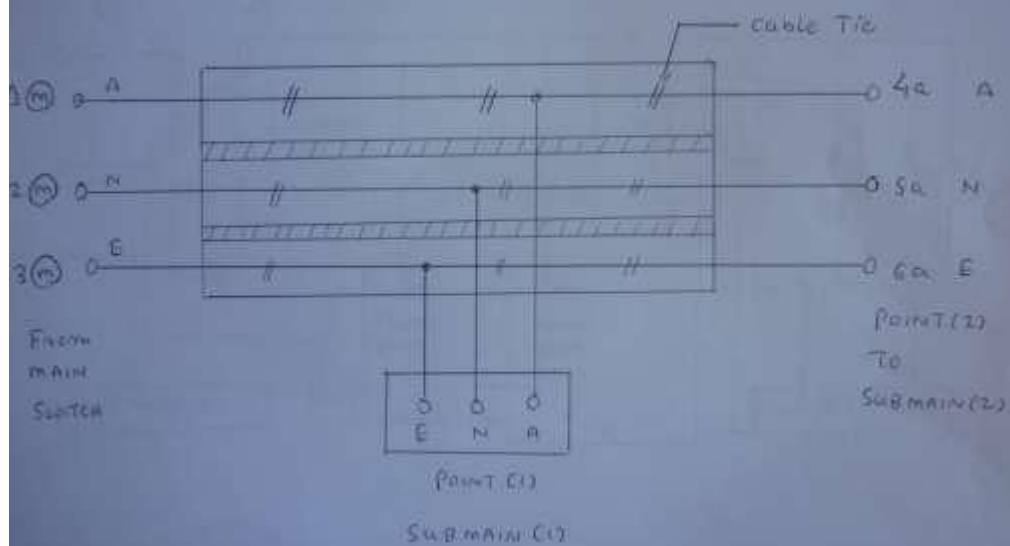
Sub-main Board Wiring

Wire the main, sub-main and distribution board wiring by using the following circuit diagrams (OR)
Trace the circuit & draw the circuit diagram.

PRACTICAL (6) MAIN SWITCH



PRACTICAL (3) SUBMAIN CABLE ASSEMBLY





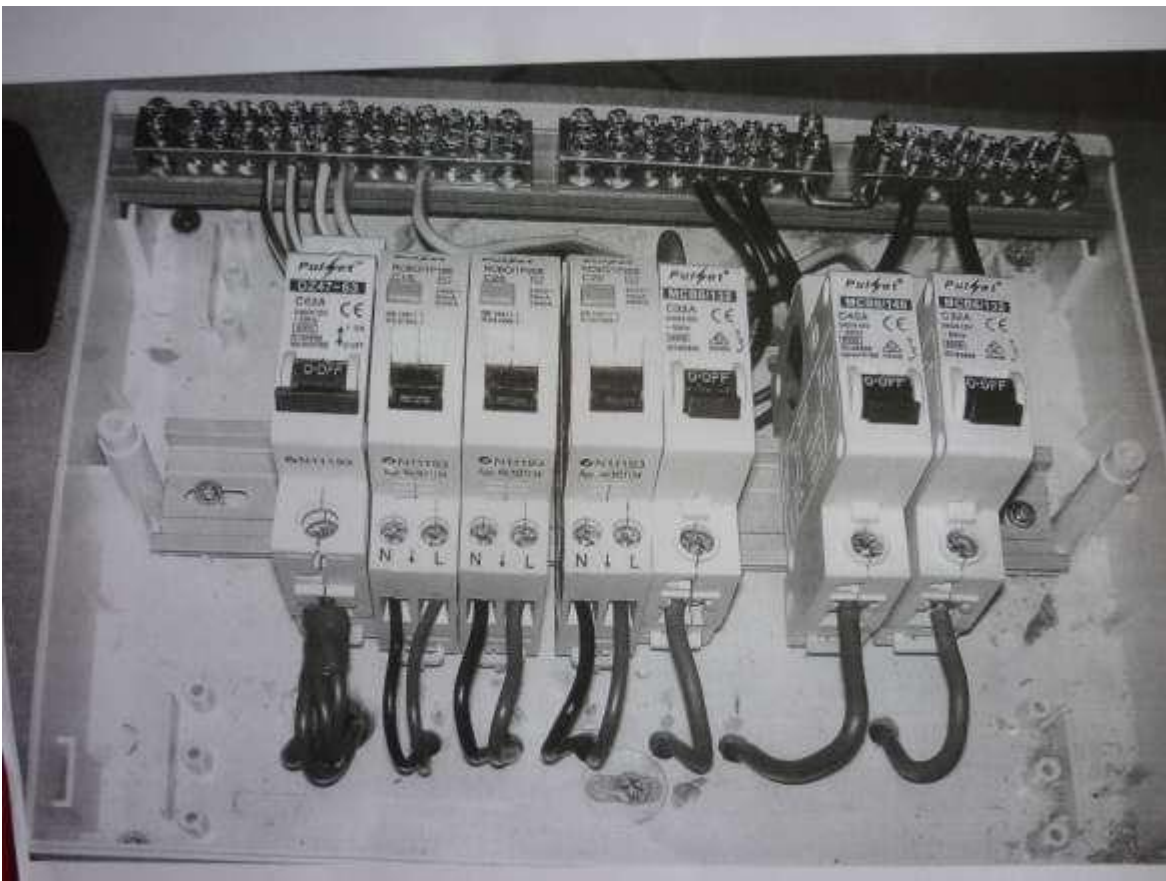
STUDENTS DESIGN PROJECT

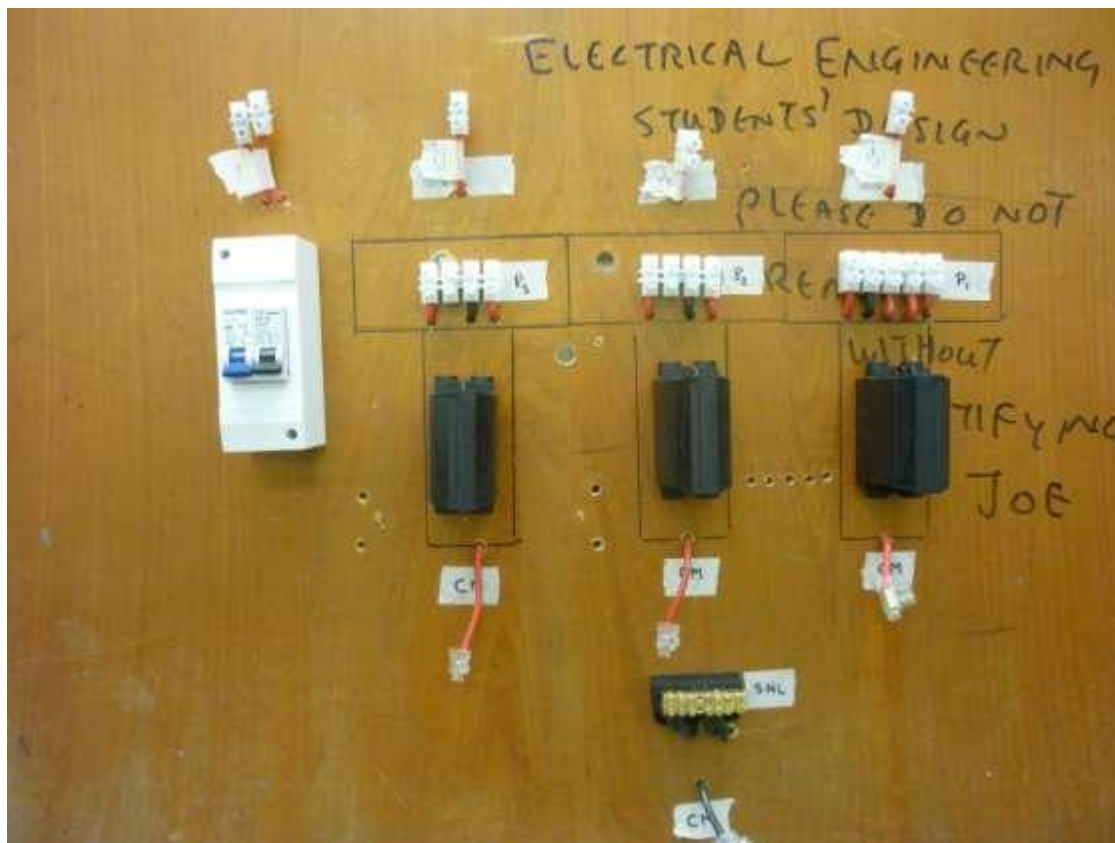
PROPERTY OF ULTIMO ELECTRICAL ENGINEERING (IN 42-11)

PLEASE DO NOT REMOVE WITHOUT NOTIFYING

JLF

Engineering Department





Theory knowledge

1.2 Safety and other regulatory requirements to which the electrical installation shall comply are identified, obtained and understood.

Q1 Interpret the following symbols (4 marks)



Answer+Marking Guide—Each 1 mark

Eye Safety Glass must be worn

Biochemmical Hazard warning

Electrical Hazard

Head Protection must be worn

[Practical Action](#)

[Questions](#)

Q2 Who can hold a WHS entry permit?

Q3 Who can hold a Fair Work entry permit?

Q4 Who is Fit & proper person?

[ANSWER & MARKING GUIDE Each 2 marks](#)

Who can hold a WHS entry permit

Under the *Work Health and Safety Act 2011* (the WHS Act) a permit holder must be:

- an elected officer of the union, or
- an employee of the union,

And must:

- have satisfactorily completed prescribed training, and
- hold an entry permit under the *Fair Work Act 2009* (the Act).

Who can hold a Fair Work entry permit

Under the Act a permit holder must be:

- an elected officer of the union, or
- an employee of the union, and
- a fit and proper person to hold a Fair Work entry permit, as determined by the Fair Work Commission.

Fit & proper person

The Delegate of the Commission must be satisfied that the proposed permit holder is a 'fit and proper person' before a Fair Work entry permit can be issued. Section 513 of the Act details criteria for assessing whether a proposed permit holder is a 'fit and proper person' to hold a permit.

Practical Action 2 marks

Questions

Q5. You are a project manager of the worksite, provide your instruction to your workers to fill the attached ESH Thresold Review form.

Questions

Q5. If you want to lift a heavy item, what steps will you follow? (2 marks)

Answer

Do not bend the back.

Bend the kneel.

Hold the item with two hands.

Place the body upright.

Lift them by using kneel force

Q6. What are the risk assessment process in disconnecting & re-connecting of electrical equipments? (2 marks)

Answer+Marking Guide

Risk assessments must be based on relevant factors including:

- Operating and storage environment;
- Usage (particularly the movement of the equipment and flexing of the supply cord);
- Equipment / characteristics (function, make and model);
- Experience with the equipment;
- Age of the equipment;
- Electrical safety knowledge of typical users; and
- Previous inspection and testing results.

Q7. Write down the procedure to connect an electric motor to power supply.

Answer+Marking Guide

- Check motor rating, voltage and current by looking at the nameplate
- Check the type of motor whether AC or DC
- Measure supply voltage by meter.
- Test motor insulation resistance by megger
- Check any damage on body.
- Check the terminal / plug
- Use insulation glove to handle the motor.
- Join the supply.
- Observe noise and vibration of the motor

Students' performance is assessed

2 Select wiring systems and cables for general electrical installation

2.1 Wiring systems are selected for suitability for the environments in which they are to operate.

2.2 Cable conductor sizes are selected to meet current-carrying capacity requirements and voltage-drop and earth fault-loop impedance limitations.

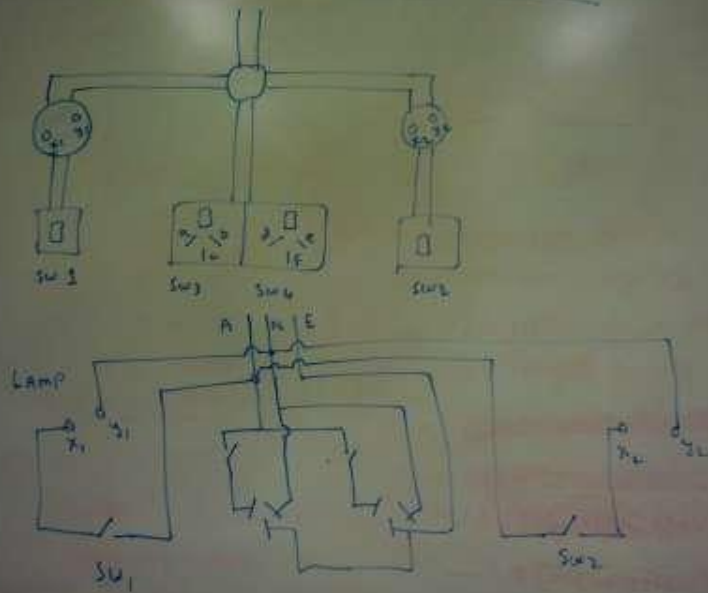
2.3 Circuit protective devices are selected to meet requirement for co-ordination with conductor current-carrying capacity.

2.4 Earthing system components are selected to meet requirements of an MEN system.

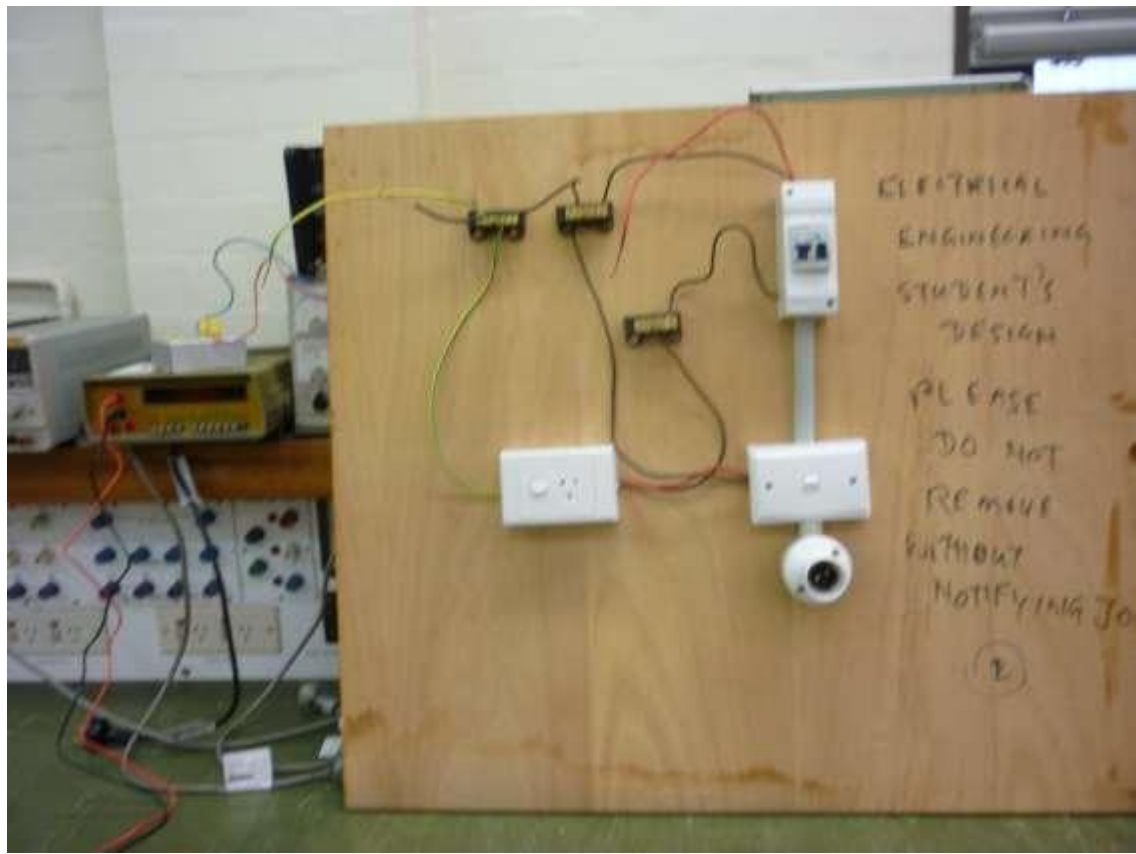
2.5 Evidence is obtained that electrical equipment selected complies with safety requirements.

Installation of the following circuit control equipments are to be assembled by the students & their performances are assessed. Practical 7 to 10

ELECTRICAL WIRING CIRCUIT ASSEMBLY AND TESTING (1)



- PROCESSES
1. CIRCUIT SET
 2. SWITCH 2
- | |
|----------|
| SW1 ON |
| SW1 OFF |
| SWITCH 2 |
| SW2 ON |
| SW2 OFF |

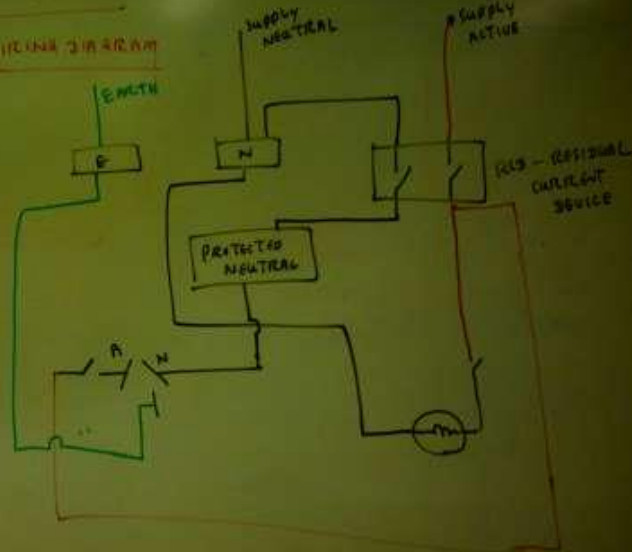


ELECTRICAL WIRING FOR OUT RESIDUAL AND TESTING (2)

PHYSICAL DIAGRAM



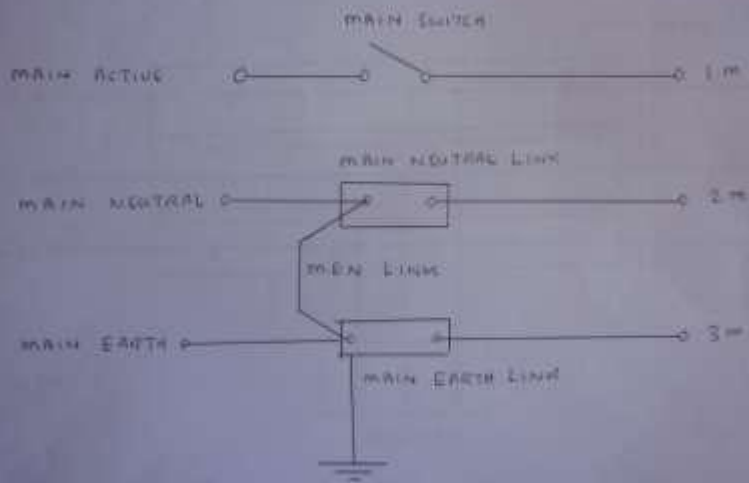
WIRING DIAGRAM



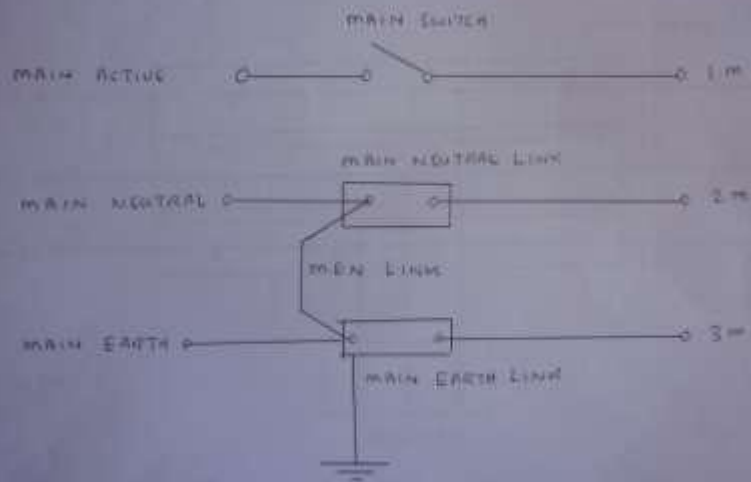
Practical 6, 7, 8 main + submain + D.O



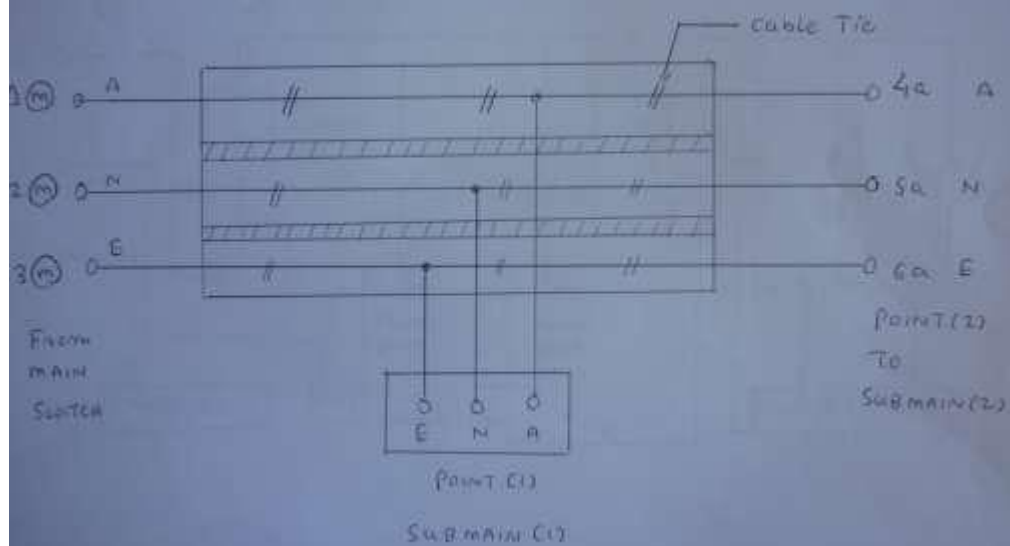
PRACTICAL (6) MAIN SWITCH

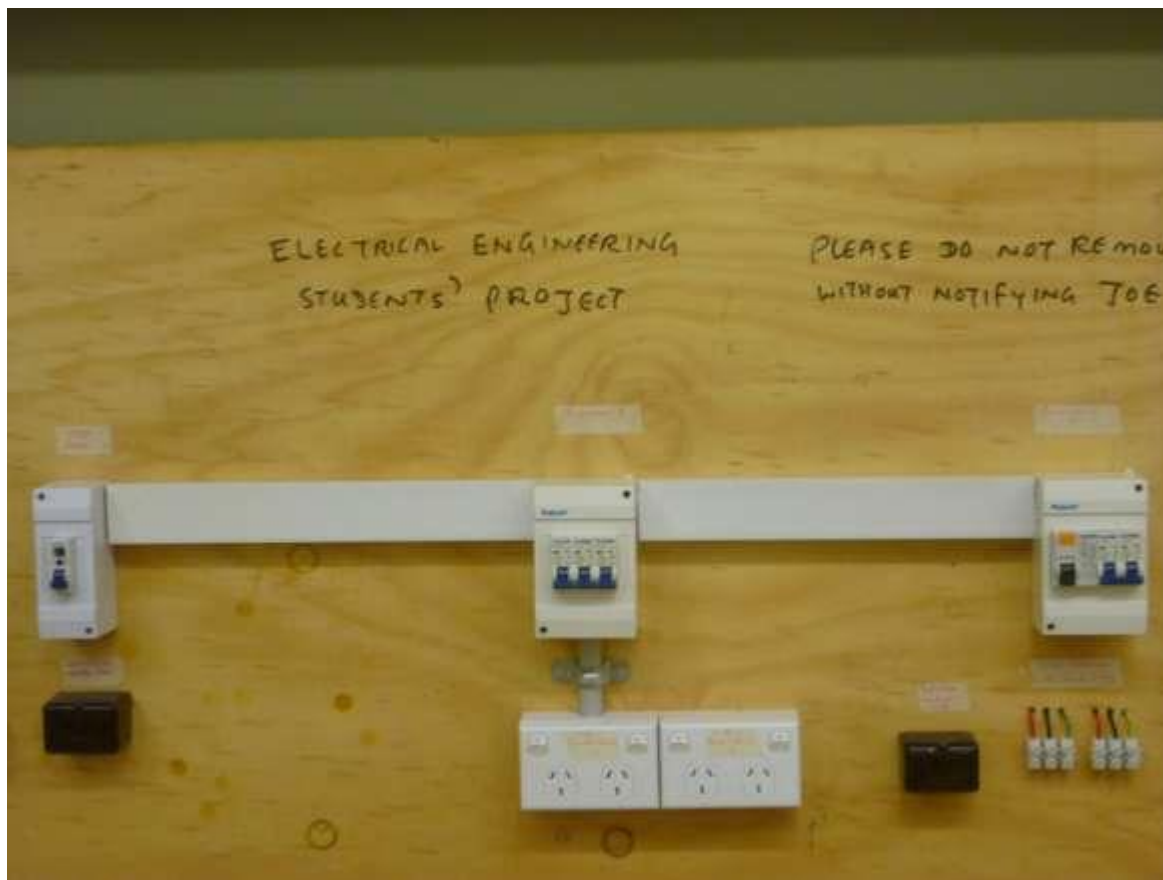


PRACTICAL (6) MAIN SWITCH



PRACTICAL (3) SUBMAIN CABLE ASSEMBLY





3 Document electrical installation circuits, control and protection arrangements

3.1 Evidence is obtained from manufacturers/suppliers that electrical equipment selected complies with safety requirements.

Practical 16

The students are instructed to collect the specifications related to usage of equipments from manufacturers.

PRACTICALS

www.electricaldiploma2013.webs.com

Study Option (1)

Click [HERE](#)

Then the students are instructed to download the followings resources to get the specifications

[Stage 1 Electrical Workshop Update](#)

[Stage 1 Electrical Workshop](#)

[Advanced Wiring Download Link](#)

[Stage 1 to 3 Practicals](#)

[Electrical Machine Practicals](#)

[Electrical Wiring Equipment](#)

Estimating & specification preparation practice is assessed.

3.2 Reasons for selections made, including calculations, are documented in accordance with established procedures.

3.3 Electrical installation arrangement and specifications for all selected items are documented in accordance with established procedures and forwarded to appropriate person(s).

Assessment Test 1 & 2-

SAG Sem 2-2016-U Kyaw Naing (Joe)/ASSESSMENT MAPPING Sem 2-2016/G107 Assessment Mapping/ G107 Test 1 Question.doc

SAG Sem 2-2016-U Kyaw Naing (Joe)/ASSESSMENT MAPPING Sem 2-2016/ G107 Test 1 Marking.pdf

SAG Sem 2-2016-U Kyaw Naing (Joe)/ASSESSMENT MAPPING Sem 2-2016/ G107 Test2 Question.pdf

The students' performance is assessed by test.

Location of Evidences (Table 1)

Performnce Criteria	Above	Location of Evidences
Marking Guide/ Assessment Cover/ Feedback own record		<p>SAG Sem 2-2016-U Kyaw Naing (Joe)/ASSESSMENT MAPPING Sem 2-2016/G107 Assessment Mapping/ G107 Test 1 Question.doc</p> <p>SAG Sem 2-2016-U Kyaw Naing (Joe)/ASSESSMENT MAPPING Sem 2-2016/ G107 Test 1 Marking.pdf</p> <p>SAG Sem 2-2016-U Kyaw Naing (Joe)/ASSESSMENT MAPPING Sem 2-2016/ G107 Test2 Question.pdf</p> <p>SAG Sem 2-2016-U Kyaw Naing (Joe)/ASSESSMENT MAPPING Sem 2-2016/ G107 Test 2 Marking Question 5.doc</p> <p>SAG Sem 2-2016-U Kyaw Naing (Joe)/ASSESSMENT MAPPING Sem 2-2016/ G107 Class Assignment</p> <p>ASSESSMENT QUESTIONS IN THE TESTS ARE BASED ON THE QUESTIONS ATTACHED WITH THIS ASSESSMENT MAPPING, BUT IN ACTUAL ASSESSMENT,THEY ARE MODIFIED, EXTRACTED SOME PARTS, APPLIED THE SIMILAR ONES,ALTER AND UTILIZED IN ASSESSMENT TASKS & THEORY TESTS FROM TIME TO TIME</p> <p>Record2016/Students/TAFE/2016 Sem 1/Sem 1 2016</p>

		<p>Students Work Assessment 1/ Questions+Marking scheme</p> <p>Record2016/Students/TAFE/2016 Sem 1/Sem 1 2016 Students Work Assessment 1/ Assessment Cover Sheet+ Assessment Feedback Sheets</p>
Students' work in own record	Summative Assessment- Formal Tests	<p>Record2016/Students/TAFE/2016 Sem 1/Sem 1 2016 Students Work Assessment 1/ G107 Assessment 1/ Student Work</p> <p>Record2016/Students/TAFE/2016 Sem 1/Sem 1 2016 Students Work Assessment 2/ G107 Assessment 2/ Student Work</p>
	Formative Assessment/Practical+ Class works	<p>Record2016/Students/TAFE/Sem 1-2016/4 May 2016 G107</p> <p>Record2016/Students/TAFE/Sem 1-2016/11 May 2016 G107</p> <p>Record2016/Students/TAFE/Sem 1-2016/18 May 2016 G107</p> <p>Record2016/Students/TAFE/Sem 1-2016/20 April 2016 G107 Practical</p> <p>Record2016/Students/TAFE/Sem 1-2016/25 May 2016 G107</p> <p>Record2016/Students/TAFE/Sem 1-2016/30 March 2016 G107 Test 1</p>
Marking Guide to be presented for		<p>In attached USB/DVD/CD Attached</p> <p>Some documents in team share UEE11-1.5</p> <p>Printed documents</p>

audit	
Students' work to be presented for audit	In attached USB/DVD/CD Attached Some documents in team share UEE11-1.5 Printed documents

EKAS	Assessment
<p>KS01-EG107A Electrical installation — cable selection and co-ordination</p> <p>Evidence shall show an understanding of selecting cables and ensuring co-ordination between protection device and conductors in electrical installations that comply with the Wiring Rules, Selection of cables standards and Service Rules to an extent indicated by the following aspects:</p> <p>T1 Performance requirements - design and safety encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> harmful effects against which the design of an electrical installation must provide protection. <input type="checkbox"/> performance standards of a correctly functioning electrical installation. <input type="checkbox"/> supply characteristics that shall be considered when designing an electrical installation. <input type="checkbox"/> acceptable methods for determining the maximum demand in consumer's mains and sub-mains. <input type="checkbox"/> AS/NZS 3000 requirements limiting voltage drop in an installation. <input type="checkbox"/> reason for dividing electrical installations into 	<p>Test 1 & Test 2</p> <p>Online Practical Support</p> <p>www.electricaldiploma2013.webs.com</p> <p>G033+G063+G107 (Week 1 to 6 Lessons)(G033)</p> <p>G106 Cable Termination (UG Cable)</p> <p>G106 Cable Termination</p> <p>G106+G033 Practical (Concurrently with G107)</p> <p>G033+G063+G107 Week 10 to 15</p> <p><u>Youtube Videos for Electrical Engineering Lessons</u></p> <p><u>Australian Electrician Training</u></p>

circuits and the factors that shall determine their number and type.

- typical external factors that may damage an electrical installation and that shall be considered in the installation design.
 - methods for protecting persons and livestock against direct and indirect contact with conductive parts and the typical application of each.
 - acceptable methods of protection against the risks of ignition of flammable materials and injury by burns from the thermal effects of current, in normal service.
 - likely sources of unwanted voltages and the methods for dealing with this potential hazard.
 - acceptable methods for protecting persons and livestock against injury and property against damage from the effects of over current.
 - requirement for protection against fault current.
 - requirement for protection against the harmful effects of faults between live parts of circuits supplied at different voltages.
 - need for protection against injury from mechanical movement and how this may be achieved.
 - features of 'fire rated construction' and how the integrity of the fire rating can be maintained in relation to electrical installation.
- T2 Final subcircuit arrangements encompassing:
- factors that shall be considered in determining the number and type of circuits required for an installation.
 - daily and seasonal demand for lighting, power, heating and other loads in a given installation.

[AS3000](#)

[AS3000:2016](#)

[AS3008](#)

[NSW Electrical Services Rule](#)

[Electrician Capstone unit](#)

[Electrician Capstone Test Old Questions](#)

[Electrician Capstone Unit Study Guide.zip](#)

Online practical Work performance practical PLUS Online reference resources are provided to the students to acquire the competencies needed in this unit

- number and types of circuits required or a particular installation.
- current requirements for given final subcircuits.
- layout/schedule of circuits for given installations.

T3 Factors affecting the suitability of wiring systems encompassing:

- wiring systems typically used with various construction methods and particular environments.
- installation conditions that may affect the current-carrying capacity of cables.
- external influences that may affect the current-carrying capacity and/or may cause damage to the wiring system.
- AS/NZS 3000 requirements for selecting wiring systems for a range of circuits, installation conditions and construction methods into which the wiring system is to be installed. Note: Wiring systems include cable enclosures, underground wiring, aerial wiring, catenary support, emergency systems, busbar trunking and earth sheath return.

T4 Maximum demand on consumer's mains/submains encompassing:

- acceptable methods for determining the maximum demand on an installation's consumer's mains and submains.
- maximum demand for the consumer's mains for given installations up to 400 A per phase.
- maximum demand for given submains.

T5 Cable selection based on current carrying capacity requirements encompassing:

- installation conditions for a range of wiring systems and applications.

- external influences that require the use of a derating factor.
 - AS/NZS 3000 requirements for coordination of cables and protection devices.
 - AS/NZS 3008 used to select conductor size based on the maximum current requirement for a given installation condition including any applicable derating factors.
- T6 Cable selection based on voltage drop requirements encompassing:
- AS/NZS 3000 requirements for maximum voltage drop in an installation.
 - relevant tables in AS/NZS 3008 for unit values of voltage drop.
 - calculation of the expected voltage drop in a given circuit.
 - selecting cables to satisfy voltage drop requirements in addition to current carrying capacity requirements.
- T7 Cable selection based on fault loop impedance requirements encompassing:
- AS/NZS 3000 requirements for maximum fault loop impedance in an installation.
 - relevant tables in AS/NZS 3008 to determine cable impedances.
 - calculation of the expected fault loop impedance for a given circuit arrangement.
 - selecting cables to satisfy fault loop impedance requirements in addition to current carrying capacity requirements and voltage drop requirements.
- T8 Selecting protection devices encompassing:
- acceptable methods of protection against indirect contact.
 - AS/NZS 3000 requirements for selecting methods and devices to protect against

indirect contact for a range of installation types and conditions.

- coordination between conductors and protection devices to ensure the protection of cables from over heating due to over current.
- possible injuries to persons and livestock from hazards due to a short circuit.
- AS/NZS 3000 requirements for selecting devices to protect against overload current for a range of circuits and loads.
- AS/NZS 3000 requirements for selecting devices to protect against short-circuit current for a range of installation conditions.

T9 Selecting devices for isolation and switching encompassing:

- requirements for the provision of the isolation of every circuit in an electrical installation.
- need for protection against mechanical movement of electrically activated equipment.
- AS/NZS 3000 requirements for selecting devices for isolation and switching for a range of installations and conditions.

T10 Switchboards encompassing:

- AS/NZS 3000 and local supply authority requirements for switchboards.
- tariff structures for the supply of electricity.
- equipment installed at the main switchboards with capacities up to 400 A per phase.
- layout of a main switchboard for an installation supplied with single phase single tariff whole current metering.
- layout of a main switchboard for an installation supplied with single phase multiple tariff whole current metering.

<ul style="list-style-type: none"> <input type="checkbox"/> layout of a main switchboard for an installation supplied with multiphase single tariff whole current metering. <input type="checkbox"/> layout of a main switchboard for an installation supplied with multiphase multiple tariff whole current metering. <input type="checkbox"/> layout of a main switchboard for a multiple tenancy installation with whole current metering. <input type="checkbox"/> layout of a main switchboard, including metering, for an installation supplied with three phase CT metering. <input type="checkbox"/> local supply authority requirements for connection of an electrical installation to the electrical supply system 	
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Location of Evidences (Table 1)

ASSESSMENT SCHEDULE

Performance Criteria	Assessment 1 Practical		Assessment 2 Theory
	Continuous Observation	Written Assessment as part of Practical	Written Assessment
1.1		X	X
1.2		X	X
1.3	X		
1.4	X		
1.5	X		
1.6	X		
1.7	X		

2.1	X		
2.2	X		
2.3	X		
2.4	X		
2.5	X		
2.6	X		
2.7		X	X
3.1	X		
3.2	X		
3.3			X
3.4			X
EKAS Assessment		X	X

ELECTRICAL TRADE REFERENCE

<http://electricaldiploma2013.zoomshare.com/files/electricaltradereference.htm>

[Advanced Diploma in Electrical Engineering Exercises](#)

Click [HERE](#)

Instruction for use: These instructions should be deleted from the completed assessment cover sheet.

This template is to be used by teaching sections to create an assessment Observation checklist for an assessment(s) conducted in the presence of an assessor. The completed Observation checklist must be signed by the student/s and retained by the teaching section.

Faculty:	Construction Engineering Transport	Campus:	Ultimo
Teaching section:	Electrical Engineering		
Qualification Number and Name:	UEE62111/UEE62211		
Unit of Competency Number and Name:	UEEEL0024+ UEEEL0025+ UEEEL0008 + UEEEL0009+ UEEEL0010+ UEEEL0003		
Assessment Task:		Duration: (Hours and minutes)	
Assessment Date:		Location:	

Assessment instructions: delete or add dot points as required

- Write your name and student number in the appropriate fields
- Do not use Pencil unless otherwise specified by the assessor (e.g. for technical drawings etc)
- This assessment must be completed within the allocated duration.
- Personal electronic devices (mobile phones / IPad) are not permitted.
- You will be observed performing skills by your teacher and assessed accordingly

Assessment Criteria:

- List the performance criteria and performance evidence being assessed by **this** assessment task.

Resources to be supplied by students: delete or add dot points as required

- Pen, pencil, eraser, ruler, toolkit, uniform, safety PPE, etc.

Resources permitted during assessment: delete or add dot points as required

- Standard Dictionaries
- Technical Dictionaries
- Bilingual Dictionaries
- Programmable Calculators
- Non-programmable Calculators

Student Name:			
Student ID:		Group:	
Student signature:		Date:	

Performance criteria and performance evidence being observed	Y	N	Assessor comments
1. Identify & insert performance criteria / performance evidence of assessment	Y		
Preparation process to perform the task as described in assessment mapping			
2. Identify & insert performance criteria / performance evidence of assessment	Y		
Progress processes in performing the tasks as described in assessment mapping			
3. Identify & insert performance criteria / performance evidence of assessment	Y		
Application of theoretical knowledge as described in assessment mapping			
4. Identify & insert performance criteria / performance evidence of assessment	Y		
Application of practical methods as described in assessment mapping			
5. Identify & insert performance criteria / performance evidence of assessment	Y		
Presentation of final output & record keeping as described in assessment mapping			
6. Identify & insert performance criteria / performance evidence of assessment	Y		
Review/Revise/OHS as described in assessment mapping			

UEEEL0024+ UEEEL0025 **Solve problems in single and three phase low voltage machines Transformers + Induction Machines**

- 1.Prepare to solve single and three phase low voltage machines problems.
- 2.Solve single and three phase low voltage machine problems.
- 3.Complete work and document problem solving activities.

UEENEEG033A **Solve problems in single and three phase low voltage electrical apparatus and circuits**

UEEEL0008 Evaluate and modify low voltage heating equipment and controls*

UEEEL0009 Evaluate and modify low voltage lighting circuits, equipment and controls*

EEEL0010 Evaluate and modify low voltage socket outlets circuits*

- 1.Prepare to solve single and three phase low voltage electrical apparatus/ circuit problems.
- 2.Solve single and three phase low voltage electrical apparatus/circuit problems.
- 3.Complete work and document problem solving activities.

UEEEL0003A **Arrange circuits, control and protection for general electrical installations**

- 1.Prepare to arrange electrical installations circuits, control and protection
- 2.Arrange electrical installations circuits, control and protection
- 3.Document electrical installation circuits, control and protection arrangements

Assessment Outcome:	<input type="checkbox"/> [Satisfactory - S] ✓ <input type="checkbox"/> [Not Satisfactory - NS] <input type="checkbox"/> Resubmission (RS)
Assessor's comment regarding student performance	

Assessor's comment should be specific and based on the marking criteria for the specific assessment event.

Assessor's recommendation on how to improve the performance (if there is any gap)

Assessor's comment should be specific and based on the marking criteria for the specific assessment event.

**Assessor Name/
Signature:** U Kyaw Naing

Date:

Student Feedback on Outcome(s):

The results of my performance have been discussed and explained to me.

If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.

**Student's
signature:**

Date:

Instruction for use: These instructions should be deleted from the completed assessment cover sheet.

This template is to be used by teaching sections to create an assessment Observation checklist for an assessment(s) conducted in the presence of an assessor. The completed Observation checklist must be signed by the student/s and retained by the teaching section.

Faculty:	C.E.T.	Campus:	
Teaching section:	Electrical Engineering		
Qualification Number and Name:	Advanced Diploma of Engineering Technology Electrical		
Unit of Competency Number and Name:	UEECD0036 Provide engineering solutions for problems in complex multiple path circuits		
Assessment Task:		Duration: (Hours and minutes)	
Assessment Date:		Location:	

Assessment instructions: delete or add dot points as required

- Write your name and student number in the appropriate fields below
- Do not use pencil unless otherwise specified by the assessor (e.g. for technical drawings etc)
- This assessment must be completed within the allocated duration.
- Personal electronic devices (USBs / mobile phones / IPads etc) are not permitted.
- You will be observed performing skills by your teacher and assessed accordingly

Assessment Criteria:

- The assessment criteria is listed under each performance criteria for each of the 3 element sections listed below. This assessment observation task's aims to evaluate each performance criteria to prove that the performance evidence has being assessed.

Resources to be supplied by students:

- Pen, pencil, eraser, ruler, toolkit, uniform, safety PPE, etc.

Resources permitted during assessment:

- Standard Dictionaries
- Technical Dictionaries
- Bilingual Dictionaries
- Programmable Calculators
- Non-programmable Calculators

Student Name:			
Student ID:		Group:	
Student signature:		Date:	

Performance criteria and performance evidence being observed	Y	N	Assessor comments
1. Prepare to work on D.C. electrical circuits.			
1.1 OHS procedures for a given work area are identified, obtained and understood.			
a. Has the student completed a E104 Risk Assessment form?			
b. Is the area to be used for the performance of the test free from hazards?			
c. Is the student wearing proper rubber shoes?			
d. Is the student wearing loose clothing?			
e. Is the student wearing metallic chain or bracelets			
f. What possible hazards does the student envisage in performing the practical test?			
1.2 OHS risk control work preparation measures and procedures are followed.			
a. Is the student able to understand and follow the requirements and outcomes of the practical test ?			
b. Do the required components match what is required for the test?			
1.3 The nature of the circuit problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.			
a. Does the practical reflect any of the theory covered in the lecture?			
1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.			
a. This practical test is of an individualistic nature			
1.5 Sources of materials that may be required for the work are identified and accessed in accordance with established procedures.			
a. Has the student read and understood the given information and required test prerequisites?			
1.6 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.			
a. Has the student checked that tools and equipment are adequate for the test?			
b. Has the student verified that the measuring equipment is fully operational for the test purpose?			
c. Is the student aware of the proper connections to be made on the equipment/			
d. Does the student have enough leads for the connections?			
2. Resolve any D.C. circuit problem found in the practical test.			
2.1 OHS risk control work measures and procedures are followed.			
a. Is the student ensuring that the power is secure off before proceeding with the test?			
2.2 The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.			
a. Has student checked with teacher before turning the power on?			

2.3 Circuits are checked as being isolated where necessary in strict accordance OHS requirements and procedures.			
a. Verify by measurement that with switch off, there is absolutely no power to the circuit.			
2.4 Established methodological techniques are used to solve d.c. circuit problems from measure and calculated values as they apply to electrical circuit.			
a. With the knowledge of the theory covered in class, compare your theoretical with the practical results, and explain any discrepancies			
2.5 Unexpected situations are dealt with safely and with the approval of an authorised person.			
a. Has the student encountered any functional anomalies of the circuit in question and has she/he reported to the teacher?			
2.6 Problems are solved without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.			
a. Is the student handling of the equipment safe and sustainably acceptable/			
3. Complete work and document problem solving activities.			
3.1 OHS work completion risk control measures and procedures are followed..			
a. Is the student disconnecting the equipment power before dismantling the circuit?			
3.2 Work site is cleaned and made safe in accordance with established procedures.			
a. After finishing the test and dismantling the circuit, has the student checked that the work area is cleaned properly and left tidy with all the power switches secured off?			
3.3 Justification for solutions used to solve circuit problems is documented.			
a. Which theoretical methods did you use to calculate the answers to the practical test?			
3.4 Work completion is documented and appropriate person(s) notified in accordance with established procedures.			
a. Before leaving the test, has the student submitted proper documentation of the theoretical and practical test results, plus the conclusions.?			

Assessment Outcome:	<input type="checkbox"/> [Satisfactory - S] <input type="checkbox"/> [Not Satisfactory - NS] <input type="checkbox"/> Resubmission (RS)
Assessor's comment regarding student performance	

Assessor's comment should be specific and based on the marking criteria for the specific assessment event.

Assessor's recommendation on how to improve the performance (if there is any gap)

Assessor's comment should be specific and based on the marking criteria for the specific assessment event.

**Assessor Name/
Signature:**

Date:

Student Feedback on Outcome(s):

The results of my performance have been discussed and explained to me.

If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.

**Student's
signature:**

Date:

Instruction for use: These instructions should be deleted from the completed assessment cover sheet.

This template is to be used

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Faculty:	Construction Engineering Transport	Campus:	
Teaching section:	Electrical Engineering		
Qualification Number and Name:			
Unit of Competency Number and Name:	UEEEL0043+ UEEEL0041 + UEEIC0017		
Assessment Task:		Duration: (Hours and minutes)	
Assessment Date:		Location:	

Assessment instructions: delete or add dot points as required

- Write your name and student number in the appropriate fields
- Do not use Pencil unless otherwise specified by the assessor (e.g. for technical drawings etc)
- This assessment must be completed within the allocated duration.
- Personal electronic devices (mobile phones / IPad) are not permitted.
- You will be observed performing skills by your teacher and assessed accordingly

Assessment Criteria:

- List the performance criteria and performance evidence being assessed by **this** assessment task.

Resources to be supplied by students: delete or add dot points as required

- Pen, pencil, eraser, ruler, toolkit, uniform, safety PPE, etc.

Resources permitted during assessment: delete or add dot points as required

- Standard Dictionaries
- Technical Dictionaries
- Bilingual Dictionaries
- Programmable Calculators
- Non-programmable Calculators

Student Name:			
		Group:	
Student signature:		Date:	

Performance criteria and performance evidence being observed	Y	N	Assessor comments
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1. Identify & insert performance criteria / performance evidence of assessment	Y		
Preparation process to perform the task as described in assessment mapping			
2. Identify & insert performance criteria / performance evidence of assessment	Y		
Progress processes in performing the tasks as described in assessment mapping			
3. Identify & insert performance criteria / performance evidence of assessment	Y		
Application of theoretical knowledge as described in assessment mapping			
4. Identify & insert performance criteria / performance evidence of assessment	Y		
Application of practical methods as described in assessment mapping			
5. Identify & insert performance criteria / performance evidence of assessment	Y		
Presentation of final output & record keeping as described in assessment mapping			
6. Identify & insert performance criteria / performance evidence of assessment	Y		
Review/Revise/OHS as described in assessment mapping			

UEEEL0041 **Develop engineering solution for synchronous machine and control problems**

1. Prepare to develop engineering solution for synchronous machine problems.
2. Develop engineering solution for synchronous machine problems.
3. Test, document and implement engineering solution for synchronous machine problem.

UEEIC0017 **Develop engineering solutions for d.c. machine and control problems**

1. Prepare to develop engineering solution for d.c. machine problems.
2. Develop engineering solution for d.c. machine problems.
3. Test, document and implement engineering solution for d.c. machine problems.

UEEEL0043 **Develop engineering solutions for induction machine and control problems**

1. Prepare to develop engineering solution for induction machine problems.
2. Develop engineering solution for induction machine problems.
3. Test, document and implement engineering solution for induction machine problems.

Assessment Outcome:	<input type="checkbox"/> [Satisfactory - S] ✓ <input type="checkbox"/> [Not Satisfactory - NS] <input type="checkbox"/> Resubmission (RS)
Assessor's comment regarding student performance	

Assessor's comment should be specific and based on the marking criteria for the specific assessment event.

Assessor's recommendation on how to improve the performance (if there is any gap)

Assessor's comment should be specific and based on the marking criteria for the specific assessment event.

**Assessor Name/
Signature:** U Kyaw Naing

Date:

Student Feedback on Outcome(s):

The results of my performance have been discussed and explained to me.

If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.

**Student's
signature:**

Date:

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Faculty:	Construction Engineering Transport	Campus:	Ultimo
Teaching section:	Electrical Engineering		
Qualification Number and Name:	UEE62111/UEE62211		
Unit of Competency Number and Name:	UEERE0066 Renewable Energy		
Assessment Task:		Duration: (Hours and minutes)	
Assessment Date:		Location:	

Assessment instructions: delete or add dot points as required

- Write your name and student number in the appropriate fields
- Do not use Pencil unless otherwise specified by the assessor (e.g. for technical drawings etc)
- This assessment must be completed within the allocated duration.
- Personal electronic devices (mobile phones / IPad) are not permitted.
- You will be observed performing skills by your teacher and assessed accordingly

Assessment Criteria:


- List the performance criteria and performance evidence being assessed by **this** assessment task.

Resources to be supplied by students: delete or add dot points as required

- Pen, pencil, eraser, ruler, toolkit, uniform, safety PPE, etc.

Resources permitted during assessment: delete or add dot points as required

- Standard Dictionaries
- Technical Dictionaries
- Bilingual Dictionaries
- Programmable Calculators
- Non-programmable Calculators

Student Name:			
Student ID:		Group:	
Student signature:		Date:	

Performance criteria and performance evidence being observed	Y	N	Assessor comments
1. Identify & insert performance criteria / performance evidence of assessment	Y		
Preparation process to perform the task as described in assessment mapping			
2. Identify & insert performance criteria / performance evidence of assessment	Y		
Progress processes in performing the tasks as described in assessment mapping			
3. Identify & insert performance criteria / performance evidence of assessment	Y		
Application of theoretical knowledge as described in assessment mapping			
4. Identify & insert performance criteria / performance evidence of assessment	Y		
Application of practical methods as described in assessment mapping			
5. Identify & insert performance criteria / performance evidence of assessment	Y		
Presentation of final output & record keeping as described in assessment mapping			
6. Identify & insert performance criteria / performance evidence of assessment	Y		
Review/Revise/OHS as described in assessment mapping			

UEERE0012 **Develop effective engineering strategies for energy reduction in buildings**

- 1.Prepare to develop strategies for effective energy reduction in buildings
- 2.Develop strategies for effective energy reduction in buildings
- 3.Document and report strategies for effective energy reduction in buildings

Assessment Outcome:	<input type="checkbox"/> [Satisfactory - S] ✓ <input type="checkbox"/> [Not Satisfactory - NS] <input type="checkbox"/> Resubmission (RS)
Assessor's comment regarding student performance	
Assessor's comment should be specific and based on the marking criteria for the specific assessment event.	
Assessor's recommendation on how to improve the performance (if there is any gap)	
Assessor's comment should be specific and based on the marking criteria for the specific assessment event.	

**Assessor Name/
Signature:**

U Kyaw Naing

Date:

Student Feedback on Outcome(s):

The results of my performance have been discussed and explained to me.

If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.

**Student's
signature:**

Date:

Instruction for use: These instructions should be deleted from the completed assessment cover sheet.

This template is to be used by teaching sections to create an assessment Observation checklist for an assessment(s) conducted in the presence of an assessor. The completed Observation checklist must be signed by the student/s and retained by the teaching section.

Faculty:		Campus:	
Teaching section:	Electrical Engineering		
Qualification Number and Name:	UEE62111/UEE62211		
Unit of Competency Number and Name:	UEENEEE101A+102A+105A+108A+137A+G106A OR Relevant UEE30820 Units UEECD0007+UEECD0019+UEECD0020+ UEECD0025 +UEECD0016+UEEEL0023		
Assessment Task:		Duration: (Hours and minutes)	
Assessment Date:		Location:	

Assessment instructions: delete or add dot points as required

- Write your name and student number in the appropriate fields
- Do not use Pencil unless otherwise specified by the assessor (e.g. for technical drawings etc)
- This assessment must be completed within the allocated duration.
- Personal electronic devices (mobile phones / IPad) are not permitted.
- You will be observed performing skills by your teacher and assessed accordingly

Assessment Criteria:

- List the performance criteria and performance evidence being assessed by **this** assessment task.

Resources to be supplied by students: delete or add dot points as required

- Pen, pencil, eraser, ruler, toolkit, uniform, safety PPE, etc.

Resources permitted during assessment: delete or add dot points as required

- Standard Dictionaries
- Technical Dictionaries
- Bilingual Dictionaries
- Programmable Calculators
- Non-programmable Calculators

Student Name:			
Student ID:		Group:	
Student signature:		Date:	

Performance criteria and performance evidence being observed	Y	N	Assessor comments
1. Identify & insert performance criteria / performance evidence of assessment	Y		
Preparation process to perform the task as described in assessment mapping			
2. Identify & insert performance criteria / performance evidence of assessment	Y		
Progress processes in performing the tasks as described in assessment mapping			
3. Identify & insert performance criteria / performance evidence of assessment	Y		
Application of theoretical knowledge as described in assessment mapping			
4. Identify & insert performance criteria / performance evidence of assessment	Y		
Application of practical methods as described in assessment mapping			
5. Identify & insert performance criteria / performance evidence of assessment	Y		
Presentation of final output & record keeping as described in assessment mapping			
6. Identify & insert performance criteria / performance evidence of assessment	Y		
Review/Revise/OHS as described in assessment mapping			

UEECD0007 **Apply Occupational Health and Safety regulations, codes and practices in the workplace**

1. Prepare to enter a work area
2. Apply safe working practices.
3. Follow workplace procedures for hazard identification and risk control

UEECD0019 **Fabricate, assemble and dismantle utilities industry components**

1. Prepare for dismantling, assembling and fabrication work
2. Dismantle and assemble utilities industry apparatus.
3. Fabricate utilities industry components

UEECD0020 **Fix and secure electrotechnology equipment**

1. Prepare to fix and secure equipment
2. Install fixing and support devices
3. Complete fixing and support work

[UEECD0025](#) **Lay wiring/cabling and terminate accessories for extra-low voltage (ELV) circuits**

1. Prepare to lay wiring/cabling and connect accessories for extra-low voltage circuits.
2. Lay wiring/cabling and connect accessories for extra-low voltage circuits
3. Complete and report work activities.

UEECD0016 **Document and apply measures to control OHS risks associated with electrotechnology work**

1. Identify and document hazards and risks.
2. Assign levels of risk and develop and document control measures.
3. Monitor and review the control measures.

UEEEL0023 **Terminate cables, cords and accessories for low voltage circuits**

1. Prepare to terminate cables, cords and conductors
2. Terminate cables, cords and conductors
3. Test terminated cables and cords

Assessment Outcome:	<input checked="" type="checkbox"/> [Satisfactory - S] ✓	<input type="checkbox"/> [Not Satisfactory - NS]	<input type="checkbox"/> Resubmission (RS)
Assessor's comment regarding student performance			
Assessor's comment should be specific and based on the marking criteria for the specific assessment event.			
Assessor's recommendation on how to improve the performance (if there is any gap)			
Assessor's comment should be specific and based on the marking criteria for the specific assessment event.			
Assessor Name/ Signature:	U Kyaw Naing	Date:	
Student Feedback on Outcome(s):			
<input checked="" type="checkbox"/> The results of my performance have been discussed and explained to me.			
If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.			
Student's signature:		Date:	

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Faculty:	C.E.T.	Campus:	
Teaching section:	Electrical Engineering		
Qualification Number and Name:	Advanced Diploma of Engineering Technology Electrical		
Unit of Competency Number and Name:	UEECD0044 Solve problems in multiple path circuits+UEECD0046 Solve problems in single path circuits*		
Assessment Task:	Practical Test	Duration: (Hours and minutes)	2 hours
Assessment Date:		Location:	Room K2.18

Assessment instructions: delete or add dot points as required

- Write your name and student number in the appropriate fields below
- Do not use pencil unless otherwise specified by the assessor (e.g. for technical drawings etc)
- This assessment must be completed within the allocated duration.
- Personal electronic devices (USBs / mobile phones / IPads etc) are not permitted.
- You will be observed performing skills by your teacher and assessed accordingly

Assessment Criteria:

- The assessment criteria is listed under each performance criteria for each of the 3 element sections listed below. This assessment observation task's aims to evaluate each performance criteria to prove that the performance evidence has being assessed.

Resources to be supplied by students:

- Pen, pencil, eraser, ruler, toolkit, uniform, safety PPE, etc.

Resources permitted during assessment:

- Standard Dictionaries
- Technical Dictionaries
- Bilingual Dictionaries
- Programmable Calculators
- Non-programmable Calculators

Student Name:			
Student ID:		Group:	
Student signature:		Date:	

Performance criteria and performance evidence being observed	Y	N	Assessor comments
1. Prepare to work on D.C. electrical circuits.			
1.1 OHS procedures for a given work area are identified, obtained and understood.			
a. Has the student completed a E104 Risk Assessment form?			
b. Is the area to be used for the performance of the test free from hazards?			
c. Is the student wearing proper rubber shoes?			
d. Is the student wearing loose clothing?			
e. Is the student wearing metallic chain or bracelets			
f. What possible hazards does the student envisage in performing the practical test?			
1.2 OHS risk control work preparation measures and procedures are followed.			
a. Is the student able to understand and follow the requirements and outcomes of the practical test ?			
b. Do the required components match what is required for the test?			
1.3 The nature of the circuit problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.			
a. Does the practical reflect any of the theory covered in the lecture?			
1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.			
a. This practical test is of an individualistic nature			
1.5 Sources of materials that may be required for the work are identified and accessed in accordance with established procedures.			
a. Has the student read and understood the given information and required test prerequisites?			
1.6 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.			
a. Has the student checked that tools and equipment are adequate for the test?			
b. Has the student verified that the measuring equipment is fully operational for the test purpose?			
c. Is the student aware of the proper connections to be made on the equipment/			
d. Does the student have enough leads for the connections?			
2. Resolve any D.C. circuit problem found in the practical test.			
2.1 OHS risk control work measures and procedures are followed.			
a. Is the student ensuring that the power is secure off before proceeding with the test?			
2.2 The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.			
a. Has student checked with teacher before turning the power on?			

2.3 Circuits are checked as being isolated where necessary in strict accordance OHS requirements and procedures.			
a. Verify by measurement that with switch off, there is absolutely no power to the circuit.			
2.4 Established methodological techniques are used to solve d.c. circuit problems from measure and calculated values as they apply to electrical circuit.			
a. With the knowledge of the theory covered in class, compare your theoretical with the practical results, and explain any discrepancies			
2.5 Unexpected situations are dealt with safely and with the approval of an authorised person.			
a. Has the student encountered any functional anomalies of the circuit in question and has she/he reported to the teacher?			
2.6 Problems are solved without damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.			
a. Is the student handling of the equipment safe and sustainably acceptable/			
3. Complete work and document problem solving activities.			
3.1 OHS work completion risk control measures and procedures are followed..			
a. Is the student disconnecting the equipment power before dismantling the circuit?			
3.2 Work site is cleaned and made safe in accordance with established procedures.			
a. After finishing the test and dismantling the circuit, has the student checked that the work area is cleaned properly and left tidy with all the power switches secured off?			
3.3 Justification for solutions used to solve circuit problems is documented.			
a. Which theoretical methods did you use to calculate the answers to the practical test?			
3.4 Work completion is documented and appropriate person(s) notified in accordance with established procedures.			
a. Before leaving the test, has the student submitted proper documentation of the theoretical and practical test results, plus the conclusions.?			

Assessment Outcome:	<input type="checkbox"/> [Satisfactory - S] <input type="checkbox"/> [Not Satisfactory - NS] <input type="checkbox"/> Resubmission (RS)
Assessor's comment regarding student performance	

Assessor's comment should be specific and based on the marking criteria for the specific assessment event.

Assessor's recommendation on how to improve the performance (if there is any gap)

Assessor's comment should be specific and based on the marking criteria for the specific assessment event.

**Assessor Name/
Signature:**

Date:

Student Feedback on Outcome(s):

- The results of my performance have been discussed and explained to me.

If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.

**Student's
signature:**

Date:

Renewable Energy

Unit Number	Unit Name
UEERE0066	Develop effective engineering strategies for energy reduction in buildings*
UEERE0061	Design grid-connected photovoltaic power supply systems*
UEERE0060	Design grid-connected battery storage systems*
UEERE0064	Design renewable energy heating systems*

	Engineering Associate Competency	EKAS	Delivery
	EA1 KNOWLEDGE BASE EA1.1 Knowledge of science and engineering fundamentals		https://www.iqytechnicalcollege.com/electricaldiploma2023.htm#Z1
EA 1.1 a	<i>fundamental knowledge that ensures portability of their skills across different operating environments.</i> a. Knowledge of mathematics sufficient to understand from an analytical viewpoint the physical phenomena relevant to the field of engineering and to the technologies commonly employed, and the functioning and limitations of relevant plant and equipment; and to solve problems commonly encountered in the field		Theory Contents Transposition, logarithm, power, variation, proportion, reading mathematical tables, addition of inversed variables Practical Contents Calculation of heat loss/ gain, ventilation, Thermal conductance (U) value calculation, application of psychometric chart. Calculation of solar irradiation & shading assessment Way of assessment Test+Assignment
EA 1.1 b	b. Knowledge in the physical sciences, life sciences and information sciences sufficient to understand situations addressed by the field of engineering and the functioning and limitations of relevant plant and equipment		Theory Contents Thermodynamics, climate, photo-voltaics, heat flow, climate & human comfort, steady state thermal analysis, heat loss/ heat gain, heat pump Practical Contents Observing sun position, effect on shading, daily sun rise/ sun set. Heat emission

			<p>due to activities</p> <p>Way of assessment Observatory report</p>
EA 1.1 c	c. Sound basic knowledge of the engineering sciences that support the field of engineering and the technologies employed, and ability to apply this knowledge in normally-encountered situations; awareness of the further scope of relevant engineering sciences	<p>2.20.12 (c,d,e,f)</p> <p>2.20.12 (a,b,g)</p> <p>2.20.12 (a,c,i)</p> <p>2.20.12 (j,k)</p>	<p>Theory Contents Solar efficient housing overview, climate and human comfort, solar geometry and radiation, thermodynamics principles and heat flows, windows and shading, insulation, thermal mass and storage, design for climate and sites, design and assessment tools, steady state thermal analysis, Basic function of an inverter, including the output waveforms of different types</p> <p>Practical Contents Design for climate and sites, design and assessment tools, steady state thermal analysis,</p> <p>Way of assessment Test+Project Assignment</p>
EA 1.1 d	d. Knowledge of the properties of materials commonly used in the field of engineering	<p>2.20.12 (c,d,e,f)</p> <p>2.20.12 (a,b,g)</p> <p>2.20.12 (l)</p>	<p>Theory Contents Insulation, thermal mass and storage, U values for building elements, refrigerant, materials and devices used for airconditioning system operation of grid interactive PV systems including synchronisation, safety features, power flow control and metered energy for systems with and without energy storage.</p> <p>Practical Contents Selection and assessment of thermal mass and storage materials</p> <p>Way of assessment Test+Project Assignment</p>
EA 1.1 e	e. Analytical skills sufficient to understand and quantify operating situations and to recognise when they may exceed the limits of accepted procedures	<p>2.20.12 (c,d,e,f)</p> <p>2.20.12 (c,d,e,f)</p>	<p>Theory Contents Concepts of Airconditioning systems application. Operation of solar space heating and water heating system, ventilation system operation, electric heating system operation, fire protection and lighting systems. Building system lighting management and energy efficient lights selecting and sizing an inverter and</p>

			<p>balance of system components including cabling, circuit protection and isolation equipment for a grid connected PV system with or without energy storage.</p> <p>Practical Contents Design & evaluation of Operation of solar space heating and water heating system,</p> <p>Way of assessment Test+Project Assignment</p>
EA 1.1 f	f. Appreciation of the future need to apply fundamental knowledge to ongoing developments in the field of engineering and to new technologies relevant to the field	.20.12 (h,j,k) 2.20.12 (h,j,k) 2.20.12 (a,c,i)	<p>Theory Contents Benefit of solar efficient building, green house effect, global warming, energy efficiency, energy conservation, climate comfort and design strategies, environment and energy, factors affecting building energy use, potential for energy saving,</p> <p>Practical Contents Internet research related to global warming, Kyoto protocol, energy efficiency and renewable energy.</p> <p>Way of assessment Research report</p>
EA 1.2 a	<p>EA1.2 Knowledge and understanding of engineering and technology</p> <p>a. Sound knowledge and understanding of the functioning, performance and operating characteristics of plant and equipment used in the field of engineering</p>	2.20.12	<p>Theory Contents Practical application aspects of of Air-conditioning systems application. Operation of solar space heating and water heating system, ventilation system operation, electric heating system operation, fire protection and lighting systems. Building system lighting management and energy efficient lights</p> <p>Practical Contents Design & evaluation of Operation of solar space heating and water heating system,</p> <p>Way of assessment Test+Project Assignment</p>

EA 1.2 b	b. Ability to apply analytical techniques and knowledge of engineering science to quantify requirements, and to the specification of equipment and materials (where appropriate, including software) to perform satisfactorily in particular situations	2.20.12 (h,j,k)	<p>Theory Contents Analyzing the relation between climate and human comfort, humidity, psychometric chart, Relationship between climate conditions and building design . Analyzing the properties of building construction materials and their effect on heat loss/ heat gain. Analyze the relation between Sun position, shading and natural lighting. The relations to building energy use. Analyze the effect of windows & glass positions on natural lighting/ heat loss/ heat gain and energy efficiency</p> <p>Practical Contents Analyzing the properties of building construction materials and their effect on heat loss/ heat gain. Analyze the relation between Sun position, shading and natural lighting. The relations to building energy use.</p> <p>Way of assessment Test+Project Assignment</p>
EA 1.2 c	c. Competence in applying mathematics, science and engineering science to the solution of problems and situations routinely encountered in the field of engineering	2.16.13 2.20.12	<p>Theory Contents Application of mathematical solutions for Analyzing the relation between climate and human comfort, humidity, psychometric chart, Relationship between climate conditions and building design . Analyzing the properties of building construction materials and their effect on heat loss/ heat gain. Analyze the relation between Sun position, shading and natural lighting. The relations to building energy use. Analyze the effect of windows & glass positions on natural lighting/ heat loss/ heat gain and energy efficiency</p> <p>Practical Contents Analytical problem solutions for the above topics</p> <p>Way of assessment Test+Project Assignment</p>

EA 1.2 d	d. Awareness of current technical and professional practice, critical issues, and the current state of developments in field of engineering		<p>Theory Contents Global warming, green house effect, UN Climate change conference, Kyoto Protocol, Australia’s position on greenhouse reduction. Federal Government ‘s climate change policies, Opposition party’s climate change policies, Carbon trading scheme, Home insulation scheme, current energy efficiency issues Major non-technical considerations impacting on the design, installation and operation of grid connected PV systems including economic, financial, contractual, institutional, legislative and regulatory</p> <p>Practical Contents Research report</p> <p>Way of assessment Report</p>
EA 1.2 e	e. Ability to relate changing practices to existing knowledge and to question apparent departures from established principles	2.7.1.1	<p>Theory Contents Traditional building construction/ air con system CVS energy efficient building system, Lighting management, energy efficient light, energy auditing and building survey. Energy saving system</p> <p>Practical Contents Energy audit, comparing the effect of new practice on saving energy</p> <p>Way of assessment Project report</p>
EA 1.2 f	f. Understanding of how new developments in the field of engineering relate to established theory and practice, and to other technical areas with which they may interact	2.8.8	<p>Theory Contents New energy efficient building system and solar system application. Solar electrical system. Grid connected photovoltaic inverter. Wind and bio gas system Basic function of an inverter, including the output waveforms of different types. b) Operation of an inverter bridge and half-bridge. c) Function of PWM techniques in modified square wave and synthesised sine wave inverters.</p> <p>Practical Contents Research report</p> <p>Way of assessment Report</p>

EA 1.3.a	<p>EA1.3 Techniques and resources</p> <p>a. Awareness of standard design practices and tools currently used in the field, particularly computer based tools and packages, and competence in their use</p>	<p>2.16.13 2.20.12</p>	<p>Theory Contents Possun, Solar RAD software, Application of software to calculate irradiation & shading. Solar inverter/ battery selection using the software</p> <p>Practical Contents Software application</p> <p>Way of assessment Project report</p>
EA 1.3.b	<p>b. Proficiency in laboratory and testing procedures relevant to the field, and strong grasp of principles and practices of laboratory safety</p>	<p>2.16.13 2.20.12</p>	<p>Theory Contents Solar modules installation & principle of operation Characteristics which distinguish inverters suitable for grid connected photovoltaic array application from standard inverters.</p> <p>Practical Contents Software application. Solar modules testing</p> <p>Way of assessment Practical report</p>
EA 1.3.c	<p>c. Ability to calibrate and use measuring instruments, conduct relevant measurements and tests, analyse and interpret data and form reliable conclusions</p>	<p>2.16.13 2.20.12</p>	<p>Theory Contents Testing solar modules , determining IV characteristics. Using compass & clinometers to determine the sun position. Se Google Earth to determine the orientation of a building Use geographical chart & table to determine the latitude longitude angle of the particular place & apply solar calculation software to determine the irradiation & design of solar electrical system</p> <p>Practical Contents Software application. Solar modules testing</p> <p>Way of assessment Practical report</p>

EA 1.3.d	d. Knowledge of common sources of error and their avoidance: ability to recognise known sources of error, eliminate or compensate for them where possible, and quantify their significance to results and conclusions drawn	2.16.13 2.20.12	<p>Theory Contents Source of error, error minimizing, validation, trigulation</p> <p>Practical Contents Comparing the practical results & computer solution</p> <p>Way of assessment Project report</p>
EA 1.3.e	e. Ability to construct and test representative components or sub-systems in a laboratory setting	2.16.13 2.20.12	<p>Theory Contents Testing solar modules , determining IV characteristics. Using compass & clinometers to determine the sun position. Se Google Earth to determine the orientation of a building Use geographical chart & table to determine the latitude longitude angle of the particular place & apply solar calculation software to determine the irradiation & design of solar electrical system</p> <p>Practical Contents Software application. Solar modules testing</p> <p>Way of assessment Practical report</p>
EA 2.1 a	<p>EA2 ENGINEERING ABILITY EA2.1 Application of standards and codes of practice a. Thorough understanding of the standards and codes of practice relating to the field of engineering and appreciation of their range of applicability</p>	2.2.40 2.5.1.1 2.7.1.1 2.8.1.2 2.8.2.1 2.8.8 2.18.1	<p>Theory Contents AS4509.1 Stand Alone Power System Part 1 Safety Requirement AS4509.1 Stand Alone Power System Part 2 Design Guidelines AS4509.1 Stand Alone Power System Part 3 Installation AS4086.2 Secondary Batteries for use with standalone power system AS3000:2007- Wiring Rules AS3010.1 –Electrical Installation=supply by generating set AS2676.1-Guide to the installation , maintenance , testing and replacement of secondary batteries in building AS3011.1/2- Electrical installations-Secondary batteries installed in building AS1170.2-Minimum design loads on structure.</p>

			<p>AS1044 Electromagnetic compatibility IEC61215 Ed 1.0- Crystalline silicon terrestrial photovoltaic modules- Design, qualification and type approval IEC60904-1 Ed 1.0- Crystalline silicon photovoltaic arrays-Onsite measurement of IV characteristics IEC60904-1 Ed 1.0- Photovoltaic devices</p> <p>Practical Contents</p> <p>Research project on application of the above standards.</p> <p>Way of assessment Project</p>
EA 2.1 b	b. Ability and commitment to apply the relevant standards and codes in all work undertaken	2.7.1.1 2.8.1.2 2.8.2.1 2.8.8	<p>Theory Contents</p> <p>Theoretical approach to design work on photovoltaic system in home electrical system by applying the standards Building construction, building electrical & mechanical system, building drawing Building standards studies</p> <p>Practical Contents</p> <p>Design work on photovoltaic system in home electrical system by applying the standards</p> <p>Way of assessment Design project</p>
EA 2.1 c	c. Ability to inspect engineering work or installations that are subject to recognised standards and codes, detect shortcomings and verify compliance or otherwise, and specify remedial action	2.7.1.1 2.8.1.2 2.8.2.1 2.8.8	<p>Theory Contents</p> <p>Photovoltaic electrical system survey, Energy auditing and building survey.</p> <p>Practical Contents</p> <p>Energy auditing and building survey.</p> <p>Way of assessment Report</p>

EA 2.2 a	<p>EA2.2 Specifying and installing systems</p> <p>a. Ability to select and combine available components to form systems meeting given specifications:</p> <ul style="list-style-type: none"> • Understand and document the client’s functional requirements • Analyse the functional requirements and develop a performance specification • Confirm that the specification can be met by standard components and equipment in compliance with applicable standards and codes of practice • Select, specify and document the system including all necessary equipment, components and software • Where possible, supervise installation of the system; or construct a prototype system • Conduct all required tests to confirm satisfactory operation • Document operating procedures 	<p>2.8.13 2.11.1 2.11.2.1 2.11.4 2.7.1.1</p>	<p>Theory Contents</p> <ul style="list-style-type: none"> • Establishing design criteria-general criteria & specific requirement • Assess and use service, matching energy sources to services • Resource and site assessment • Electrical load assessment • Preliminary sizing and costing –system voltage, array and battery sizing • Choose system configuration • Size and select major components • Predicting system performance • Costing • Finalising system design , optimization • Installation design <p>Documentation Building heat flow calculations. Determining U value, Design for climate and sites, design assessment rules. Climate comfort and design strategies, Designing for heating and cooling Application of worksheets</p>
EA 2.3 a	<p>EA2.3 Design procedures</p> <p>a. Ability to utilise standard design practices, including advanced software or other design aids, to perform detailed design of components and/or systems</p>	<p>2.8.13 2.11.1 2.11.2.1 2.11.4</p>	<p>Hot water heating system and design, electric heating system and design, electrical system and design, lighting system and design</p> <p>Application of Australian Solar Radiation Data Handbook Installation requirements for grid connected inverters</p> <p>Practical Contents</p> <p>Manual design calculations for above topics. Design with software such as PV-SPS, RA PSS, WIRE</p> <p>Way of assessment</p> <p>Project</p>

EA 2.3 b	b. Ability to perceive unexpected or inconsistent results of the design process, take corrective action, and bring persistent problems to attention	2.16.13 2.20.12	<p>Theory Contents Taking account on seasonal variation of sun energy. Unexpected shading effect, Changes in future load power demand. Budget estimate. Optimising</p> <p>Practical Contents Changing & modification of design</p> <p>Way of assessment Project</p>
EA 2.4 a	<p>EA2.4 Assessing technical and policy options</p> <p>a. Ability to undertake feasibility studies for prototype development; upgrading, extension or replacement of plant or equipment; procurement of new equipment; new operational procedures etc:</p> <ul style="list-style-type: none"> • Understand and document the objectives • Formulate performance measures including functionality, maintainability, safety, sustainability, user impact, training requirements, and cost-effectiveness • Consult technical and other literature to identify available options • Evaluate options and quantify or rank each against the performance measures • Recommend and justify preferred option • Produce clear and concise report of the investigation, comprehensible to both technical and nontechnical 	2.2.40 2.5.1.1 2.7.1.1	<p>Theory Contents</p> <ul style="list-style-type: none"> • Establishing design criteria-general criteria & specific requirement • Assess and use service, matching energy sources to services • Resource and site assessment • Electrical load assessment • Preliminary sizing and costing –system voltage, array and battery sizing • Choose system configuration <p>Provide feasible study , possibility to commission the system, cost estimate, technical availability , availability of required devices</p> <p>Practical Contents Feasibility study report</p> <p>Way of assessment Report</p>

	readers		
EA 2.5 a	EA2.5 Observation, analysis and testing a. Ability to conduct expert analysis and testing of materials or processes using agreed procedures, calibrate test instruments and processes, record data, and provide advice on properties, condition, or satisfactory operation	2.16.13 2.20.12	Testing of solar modules. IV characteristics. Testing of solar electrical system suitable location for the PV array, batteries and other components at a given installation site in accordance with AS 4509 and AS 4086.2. major installation requirements for all system components which will ensure correct operation, long life, safety and ease of maintenance consistent with AS 4509, AS 4086.2, AS/NZS 3000 and relevant OH&S guidelines. start-up and shut-down procedures as well as a commissioning procedure for a PV power system in accordance with AS 4509. test on a PV system to determine correct operation. installation and commissioning work on a PV power system in accordance with AS 4509, AS 4086.2, AS/NZS 3000 and AS 3010.1.
EA 2.5 b	b. Ability to critically observe, test and record progress of construction, assembly and commissioning of engineering work	2.5.1.1 2.7.1.1 2.11.1 2.11.2.1 2.11.4	Assembly & commission works of solar electrical, hot water system Way of assessment Report
EA 2.6 a	EA2.6 Operations and maintenance a. Ability to supervise and monitor the operation of complex plant, verify satisfactory and safe operation according to agreed standards, detect and interpret unusual circumstances and bring these to attention	2.5.1.1 2.7.1.1 2.11.1 2.11.2.1 2.11.4	Operation and maintenance of solar inverter, electrical system. Air-conditioning system Operation of grid interactive PV systems including synchronisation, power flow control, passive and active anti-islanding, and metered energy for systems with and without energy storage. Way of assessment Report
EA 2.6 b	b. Ability to conduct condition monitoring and maintenance programs in accordance with agreed standards and procedures, diagnose faults or incipient faults, and propose and/or undertake remedial action	2.7.1.1	Monitoring of system performance & preparation of maintenance system Way of assessment Report

EA 2.6 c	c. Ability to investigate technical malfunctions and their causes, or deviations from normal performance, and propose and/or undertake remedial action	2.5.1.1 2.7.1.1 2.11.1 2.11.2.1 2.11.4	Studying the maintenance manuals Way of assessment Report
EA 2.7c	Candidates from mainly educational background: b. Appreciation of the likely need to undertake advanced training in specific equipment or procedures and take responsibility for their condition or operation	2.16.13 2.20.12	Use of light meters, PV inverters. Battery testers. Solar design software Way of assessment Practical performance
EA 2.8 b	b. Ability to identify, assess, communicate and manage technical risk in area of expertise		Risk assessment in PV installation. OHS legislations Way of assessment Report
EA 2.8 c	c. Appreciate the interactions between technical systems and the social, cultural, environmental, economic and political context in which they operate	2.16.13 2.20.12	Theory Contents Sustainability issue, RE system, short term & long term advantages, Economic issues, payback, discount, externalities, Environmental issues, energy payback time, ecologically sustainable development. Social issues, use of energy over population growth, health of community, access to energy supply, employment opportunities, attitudes & lifestyles. Education & training Practical Contents Research report on how renewable energy/ energy efficient building design is related to economic, environmental and social issues. Way of assessment Report
EA 2.8 d	d. Appreciate the imperatives of safety and of sustainability, and approaches to developing and maintaining safe and sustainable systems	2.16.13 2.20.12	Theory Contents Assessing the safety of the home energy system by applying the following standards AS4509.1 Stand Alone Power System Part 1 Safety Requirement

			<p>AS4509.1 Stand Alone Power System Part 2 Design Guidelines AS4509.1 Stand Alone Power System Part 3 Installation AS4086.2 Secondary Batteries for use with standalone power system AS3000:2007- Wiring Rules AS3010.1 –Electrical Installation=supply by generating set AS2676.1-Guide to the installation , maintenance , testing and replacement of secondary batteries in building AS3011.1/2- Electrical installations-Secondary batteries installed in building Major installation details for a proposed grid connected inverter system, based on the requirements set out in AS 4777 Parts 1 to 3.</p> <p>Practical Contents RE system safety audit</p> <p>Way of assessment Report</p>
EA 2.9 a	<p>EA2.9 Understanding of the business environment a. Introductory knowledge of the conduct and management of engineering enterprises and of the structure and capabilities of the engineering workforce</p>	<p>2.16.13 2.20.12</p>	<p>Cost-benefit analysis. Input into feasibility studies. Preparation for government rebate for RE system</p> <p>Way of assessment Report</p>
EA 2.9 b	<p>b. Appreciation of the commercial, financial and marketing aspects of engineering projects and programs and the requirements for successful innovation</p>	<p>2.16.13 2.20.12</p>	<p>Annual reduction in greenhouse gas emissions achieved by a given PV power system at a given location.</p>
EA 2.9 c	<p>c. Understanding of the need to</p>		

EA 2.9 d	<p>incorporate cost considerations throughout the design and execution of a project and to manage within realistic constraints of time and budget</p> <p>d. General awareness of business principles and appreciation of their significance</p>		
EA 3.1 a EA 3.1 b EA 3.1 c EA 3.1 d EA 3.1 e	<p>EA3 PROFESSIONAL ATTRIBUTES EA3.1 Ability to communicate effectively, with the engineering team and with the community at large</p> <p>a. Fluency in written and spoken English</p> <p>b. Ability to make clear oral and written presentations to technical and non-technical audiences</p> <p>c. Capacity to hear and comprehend others' viewpoints as well as convey information</p> <p>d. Effectiveness in discussion and in presenting arguments clearly and concisely</p> <p>e. Ability to represent engineering issues and the engineering profession to the broader community</p>		<p>Communicate with clients for proposed design & RE system</p> <p><u>Assessment</u> Client communication plan</p>
EA 3.2 a	<p>EA3.2 Ability to manage information and documentation</p> <p>a. Ability to locate, analyse, catalogue</p>	<p>2.5.1.1 2.7.1.1 2.11.1 2.11.2.1</p>	<p>Theory Contents Preparing system manual containing</p> <ul style="list-style-type: none"> List of equipments supplied and rating

	and utilise relevant information including proficiency in accessing, searching, and evaluating relevant publications	2.11.4	<ul style="list-style-type: none"> • System performance estimate / guarantee • Operation instructions- system and components • Shutdown and isolation procedure for emergency and maintenance • Maintenance procedures and timetable • Commissioning records and installation check lists • Warranty information • Original energy usage estimate • System connection diagrams • Equipment manufactures documentation and handbooks • Battery record logbooks • Generator set service logbook. <p>Practical Contents Preparation of above documentation related to the design project</p> <p>Way of assessment Design project</p>
EA 3.2 b	b. Ability to gauge the accuracy, reliability and authenticity of information		Validate the information in report
EA 3.2 c	c. Ability to produce clear diagrams and engineering sketches	2.5.1.1 2.7.1.1 2.11.1 2.11.2.1 2.11.4	<p>Theory Contents Apply AS 4509.1 section 10 to prepare Schematic diagram, wiring diagram , block diagram Schematic diagrams of common grid connected inverter circuit configurations with or without energy storage including metering arrangements, isolation and connection with respect to RCDs.</p> <p>Practical Contents Drawing</p> <p>Way of assessment</p>

			Project
EA 3.2 d	d. Fluency in current computer-based word-processing and graphics packages	2.5.1.1 2.7.1.1 2.11.1 2.11.2.1 2.11.4	<p>Theory Contents Use of AutoCAD, Electronic Workbench, Symbol 97, Solar RAD, POSSUN, PV-SPS, RA PSS, WIRE</p> <p>Practical Contents Project work by applying software</p> <p>Way of assessment Project</p>
EA 3.2 e	e. Ability to maintain records and to produce clear engineering documents such as progress reports, project reports, reports of investigations, proposals, designs, and technical directions	2.5.1.1 2.7.1.1 2.11.1 2.11.2.1 2.11.4	<p>Theory Contents Preparing, referencing & keeping records in both hard copy & softcopy for</p> <ul style="list-style-type: none"> • List of equipments supplied and rating • System performance estimate / guarantee • Operation instructions- system and components • Shutdown and isolation procedure for emergency and maintenance • Maintenance procedures and timetable • Commissioning records and installation check lists • Warranty information • Original energy usage estimate • System connection diagrams • Equipment manufactures documentation and handbooks • Battery record logbooks • Generator set service logbook. <p>Practical Contents Preparing progress reports, project reports, reports of investigations, proposals, designs, and technical directions for the above aspects</p> <p>Way of assessment Project report</p>
EA 3.2 f	f. Awareness of document identification and control procedures		Document control & reliability check

EA 3.3 a	EA3.3 Capacity for creativity and innovation a. Readiness to challenge engineering and technological practices from a technical and non-technical viewpoint, to identify opportunities for improvement	2.16.13 2.20.12	Theory Contents Development of renewable energy systems and equipments, Current practice. New products & efficiency Practical Contents Internet research on development of new RE technologies Way of assessment Report
EA 3.3 b	b. Readiness to apply creative approaches to identify and develop alternative solutions	2.16.13 2.20.12	Theory Contents Prepare the plan to apply new technologies in design Practical Contents Design project modification with new technologies Way of assessment Project
EA 3.3 c	c. Awareness of other fields of engineering and technology with which interfaces may develop, and openness to such interactions	2.5.1.1 2.7.1.1 2.11.1 2.11.2.1 2.11.4	Theory Contents Study in mechanical engineering, thermodynamics, building construction, photovoltaic , air-conditioning & refrigeration Practical Contents Application of the concepts of other engineering fields in to energy efficient building design Way of assessment Project
EA 3.3 d	d. Propensity to seek information from widest practicable range of sources	2.16.13 2.20.12	Finding RE application, market availability, source, devices, equipments and system information
EA 3.3 e	e. Readiness to engage in wide-ranging exchanges of ideas, and receptiveness to change		Exchange idea with other group in project design

EA 3.4 a	EA3.4 Understanding of professional and ethical responsibilities, and commitment to them a. Familiarity with Engineers Australia's Code of Ethics, and any other compatible codes of ethics relevant to the field of engineering, and commitment to their tenets		<p>Way of assessment</p> <p>Professional obligation. Authenticity of design.</p>
EA 3.4 b	b. Awareness of legislation and statutory requirements relevant to the field of engineering	2.5.1.1 2.7.1.1 2.11.1 2.11.2.1 2.11.4	<p>Theory Contents</p> <p>Up to date changes in the following standards & application AS4509.1 Stand Alone Power System Part 1 Safety Requirement AS4509.1 Stand Alone Power System Part 2 Design Guidelines AS4509.1 Stand Alone Power System Part 3 Installation AS4086.2 Secondary Batteries for use with standalone power system AS3000:2007- Wiring Rules AS3010.1 –Electrical Installation=supply by generating set AS2676.1-Guide to the installation , maintenance , testing and replacement of secondary batteries in building AS3011.1/2- Electrical installations-Secondary batteries installed in building</p> <p>Awareness of NSW supply authority rules. NSW Electrical Service rules. NSW consumer protection, environmental protection legislation related to energy, construction</p> <p>Practical Contents</p> <p>Research project in up to date legislation, rules and regulations</p> <p>Way of assessment</p> <p>Project</p>
EA 3.4 c	c. Familiarity with standards and codes of practice relevant to the field of engineering		<p>Theory Contents</p> <p>Performance in project report on how familiar with standards asnd codes of practice</p>

			<p>Practical Contents Evidence in project report</p> <p>Way of assessment Project</p>
EA 3.5 a	EA3.5 Ability to function effectively as an individual and in multidisciplinary and multicultural teams, as a team leader or manager as well as an effective team member a Manage own time and processes effectively, prioritising competing demands to achieve personal and team goals and objectives	2.16.13 2.20.12	Participate in team work in project design.
EA 3.5 b	b. Earn trust and confidence of colleagues through competent and timely completion of tasks		Co-operation, group works, participation, discussion, team decision making & team responsibility taking
EA 3.5 c	c. Communicate continuously and effectively with other team members	2.16.13 2.20.12	<u>Practical</u> Work with team members from different cultural backgrounds in RE project
EA 3.5 d	d. Recognise the value of cultural diversity, develop effective intercultural skills, and build network relationships that value and sustain a team ethic		<u>Assessment</u> Assessment on team work regarding group co-ordination, timely completion and progress, group activities, achievement of objects
EA 3.5 e	e. Mentor others, and accept mentoring from others, in technical and team issues		

	f. Demonstrate capacity for initiative and leadership while respecting others' agreed roles		
EA 3.6a	EA3.6 Capacity for lifelong learning and professional development a. Recognise limits to own knowledge and seek advice, or undertake research, to supplement knowledge and experience		Self learning & research work in Energy Efficient Building design
EA 3.6b	b. Take charge of own learning and development. Understand the need continually to review own strengths, determine areas for development and undertake appropriate learning programs		
EA 3.6c	c. Commit to the importance of being part of a professional community: learning from its knowledge and standards, and contributing to their maintenance and advancement		Self learning & research work in Energy Efficient Building design
EA 3.6d	d. Improve non-engineering knowledge and skills to assist in achieving engineering outcomes	2.16.13 2.20.12	Knowledge on social, environmental, cultural issues to utilize the renewable energy and reduction of tradition energy sources

UEERE0064 Design renewable energy heating systems

		Competencies	Assessment plan
1 Prepare to design RE heating system	1.1	Work health and safety (WHS)/occupational health and safety (OHS) processes and workplace procedures for a given work area are identified, obtained and applied	Concurrently assessed with OHS units
	1.2	Scope of the RE heating system electrical installation is determined from design brief	Page 18 All questions of www.highlightcomputer.com/BEGeneralREAssignment.pdf
	1.3	Safety and regulatory requirements to which the electrical installation must comply are identified, obtained and applied	Concurrently assessed with OHS units
	1.4	Design development work is planned to meet scheduled timelines in consultation with other person/s involved in the RE heating system installation or associated work	Page 18 All questions of www.highlightcomputer.com/BEGeneralREAssignment.pdf
2 Develop heating system design	2.1	RE heating system performance standards and compliance methods are applied to the design	Page 18 All questions of www.highlightcomputer.com/BEGeneralREAssignment.pdf
	2.2	Safety, functionality and budgetary considerations are incorporated in the RE heating system design	Project activities

	2.3	Power and energy management requirements are incorporated in design	Project activities
	2.4	Design aspects are verified by qualified person/s	Project activities
	2.5	RE heating system design is drafted and checked for compliance with the design brief and regulatory requirements	Page 18 All questions of www.highlightcomputer.com/BEGeneralREAssignment.pdf
	2.6	RE heating system design is documented for submission to relevant person/s for acceptance and approval	Page 18 All questions of www.highlightcomputer.com/BEGeneralREAssignment.pdf

UEERE0060 Design grid-connected battery storage systems

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

		Competencies	Assessment plan
1	1.1	Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures are identified and applied	Concurrently assessed with OHS units

	1.2	Potential grid-connected battery storage system options are determined from interpretation of site survey and available information	Site survey activities
	1.3	People or organisations involved in the design and installation are identified and roles clarified	Project activities
	1.4	Industry regulations, legal obligations and job requirements are identified and applied to work in accordance with workplace procedures	Project activities
2	Develop a grid-connected battery storage system design	2.1 Grid-connected battery storage system, performance standards and compliance methods are applied to the design development	ASSIGNMENT Page 19 to 30 All questions of www.highlightcomputer.com/BEGeneralREAssignment.pdf
	2.2	Safety, functional and budgetary considerations are incorporated in design	Concurrently assessed with OHS units
	2.3	Grid-connected battery storage system design draft is checked for compliance with the design brief, industry standards and regulations, job requirements and workplace procedures	ASSIGNMENT Page 19 to 30 All questions of www.highlightcomputer.com/BEGeneralREAssignment.pdf
	2.4	Grid-connected power supply system design is documented and submitted in line with industry standards and regulations, job requirements and workplace procedures	ASSIGNMENT Page 19 to 30 All questions of www.highlightcomputer.com/BEGeneralREAssignment.pdf

UEERE0061 Design grid-connected photovoltaic power supply systems

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

		Competencies	Assessment plan
1	1.1	Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures are identified and applied	Concurrently assessed with OHS units
	1.2	Potential grid-connected supply system options are determined from interpretation of site survey and available information	K035 (1)Inverter introduction +Site survey activities
	1.3	People or organisations involved in the design and installation are identified and roles clarified	Project management activities
	1.4	Industry regulations, legal obligations and job requirements are identified and applied to work in accordance with workplace procedures	Relevant standards activities
2	2.1	Grid-connected power supply systems, performance standards and compliance methods are applied to the design development	Q6 to 40
	2.2	Safety, functional and budgetary considerations are incorporated in design	Concurrently assessed with OHS units

	2.3	Grid-connected power supply system design draft is checked for compliance with the design brief, industry standards and regulations, job requirements and workplace procedures	Q6 to 40
	2.4	Grid-connected power supply system design is documented and submitted in line with industry standards and regulations, job requirements and workplace procedures	Q41 to 47

UEERE0063 Design off-grid photovoltaic/generating set systems

		Competencies	Assessment plan
Prepare to design off-grid PV/genset system	1.1	Work health and safety (WHS)/occupational health and safety (OHS) processes and workplace procedures for a given work area are identified, obtained and applied	Concurrently assessed with OHS units
	1.2	Scope of the off-grid PV/genset system and electrical installation is determined from site survey report and design brief	K035 (1) Inverter introduction +Site survey activities
	1.3	Safety and regulatory requirements to which the electrical installation must comply are identified, obtained and applied	Project management activities

	1.4	Design development work is planned to meet scheduled timelines in consultation with other person/s involved in the off-grid system installation or associated work	Relevant standards activities
Develop off-grid PV/genset system design	2.1	Off-grid PV/genset system performance standards and compliance methods are applied to the design	Q6 to 40
	2.2	Safety, functionality and budgetary considerations are incorporated in the off-grid PV/genset system design	Concurrently assessed with OHS units
	2.3	Power and energy management requirements are incorporated in design	Project management activities
	2.4	Design aspects are verified by qualified person/s	Project management activities
	2.5	Off-grid PV/genset system design is drafted and checked for compliance with the design brief and regulatory requirements	Q6 to 40
	2.6	Off-grid PV/genset system design is documented and submitted in line with industry standards and regulations, job requirements and workplace procedures	Q41 to 47

UEERE0061 Design grid-connected photovoltaic power supply systems

UEERE0063 Design off-grid photovoltaic/generating set systems

Assessment Questions

K035 (1) Inverter introduction

Slide 1 Q1. Sketch the waveforms for (a) DC to pulsating AC inverter (b) Modified sine wave, step sine wave inverter (c) PWM inverter.

Slide 2 Q2. Sketch the block diagram for stand alone PV system.

Slide 3+4 Q3. What is inverter?

Slide 5 Q4. What is grid tie inverter?

Slide 6 Q5. What are the applications of inverter? -----

----- (2) Inverter

Slide 1+2 Q6. Sketch basic inverter principle circuit and operating principle.

Slide 3 Q7. Sketch (a) H bridge inverter (b) Three phase inverter

Slide 4+5 Q8. Explain PWM technology and inverter circuit used with PWM technology.

Slide 6 Q9. Explain modified sine wave inverter.

Slide 7 to 10 Q10. Explain the oscillator for inverter circuit.

Slide 8+9=10+11 Q11. A crystal oscillator has the following parameters $C_p = 50\text{PF}$ $C_o = 10\text{PF}$ $R = 100\Omega$ at 10MHZ for a CMOS inverter with an open loop gain $a = 200$ calculate the value of feedback resistor.

Slide 12+13+14 Q12.Explain the operational requirement of crystal oscillator for inverter 260

Slide 15+16 Q13.Explain the basic principle of sine wave inverter. -----

----- (3) Sine wave inverter

Slide 1 Q14.Sketch the graphs for square wave , modified sine wave & pure sine wave.

Slide 2+3 Q15.Explain pulse width modulation.

Slide 4+5 Q16.Explain the operation of Bubba oscillator.

Slide 6 Q17.Sketch H bridge construction & operation table.

Slide 7 Q18.Explain MOSFET driver with sketch.

Slide 8 Q19.Explain inverter circuit protection and snubber. -----

----- (4)PWM

Slide 1 Q20.Explain PWM with sketch.

Slide 2 Q21.Explain active filter and passive filter.

Slide 3+4+5+9 Q22.Sketch the example diagram of pure sine wave inverter and explain it's operation.

Slide 2+3+4+5+6 Q25.Explain filter design.

Slide 7+8+9+10 Q26.Sketch pure sine wave inverter circuit and explain the operation.

Slide 11+12 Q27.Sketch overview of grid connected inverter system and explain it's operation. 261

Slide 13+14+15 Q28.Sketch grid connected PV system with multiple inverter.

Slide 16 Q29.Explain the energy saving aspects of solar electrical system. -----

----- (6)Switching mode + Photovoltaic inverter

Slide 1+2 Q30.Explain PV inverter system with sketch.

Slide 3+4+5 Q31.What are the causes of frequency distortion to PV inverter?

Slide 6+7 Q32.Write the equation for switching delay.

Slide 8+9 Q33.Sketch inverter output current diagrams & total harmonic distortion for unipolar switching & bipolar switching. -----
----- (7) Grid connected inverter system

Slide 1 Q34.What are the topologies of grid connected inverter?

Slide 2 Q35.Sketch transformerless PV inverter system

Slide 3+4+5 Q36.Sketch PV inverter with frequency transformer .

Slide 6 Q37.Sketch PV inverter with several conversion stage & high frequency transformer.

Slide 7 Q38.Sketch PV inverter with several conversion stages including boost stage

Slide 8 Q39.Explain the configuration and standards for grid connected PV system with diagram

. Slide 9 262 Q40.Sketch and explain the operation of wind turbine grid connected system.

Slide 10 Q41.Write the standard testing procedures for grid connected inverter.

Slide 11+12 Q42.Explain (a)MPPT (b) voltage rating & protection of solar panel (c) Sketch typical solar panel PV curve.

Slide 13 Q43.Sketch multi string PV inverter system.

Slide 14+15 Q44.Explain grid connected PV system control system with sketch. Q45.Write the mathematical modelling for switched mode inverter.

Slide 16 Q46.Express the parameters of grid connected power inverter.

Slide 17+18 Q47.Do the exercises in slide 17+18

Student Assessment Guide (Unit of Competency)

(Streamlined Training Package)

Faculty	C.E.T.	College	
Teaching Section	Electrical Engineering		
Qualification Number and Name	Advanced Diploma of Electrical Engineering Advanced Diploma of Engineering Technology - Electrical Advanced Diploma of Engineering Technology - Electronics		
Unit of Competency Number and Name	UEEEEC0075 – Troubleshoot Single Phase Input D.C. Power Supplies		
Application	<p>This unit covers determining correct operation of independent power supplies and power supply sections of electronic apparatus. It encompasses working safely, problem solving procedures, including the use of voltage, current and resistance measuring devices, providing solutions derived from measurements and calculations to predictable problems in d.c. power supplies with single phases input.</p> <p><u>Note:</u> This unit applies to all aspects of Electro-technology – engineering applications only. For general competencies related to Information Technologies refer to the latest endorsed IT Training Package.</p>		
Prerequisites	<p>Required Prerequisite Competencies: Granting competency in this unit shall be made only after competency in the following unit(s) or their superseded units in UEE20 Training Package as per mapping table http://www.highlightcomputer.com/UEE11-20Mapping.pdf has/have been confirmed.</p> <p>UEENEEE101A - Apply Occupational Health and Safety regulations, codes and practices in the workplace UEENEEE104A - Solve problems in D.C. circuits UEENEEH102A - Repair Basic Electronic Apparatus by replacement of components UEENEEH114A - Troubleshoot resonance circuits in an electronic apparatus AND UEENEEH119A - Solve problems in multiple path extra low voltage (ELV) A.C. circuits AND UEENEEH169A - Solve problems in basic electronic circuits OR UEENEEG101A - Solve problems in electromagnetic devices AND UEENEEG102A - Solve problems in low voltage A.C. circuits</p> <p>Literary and Numeracy Skills: Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 "Literacy and Numeracy"</p>		
Licensing,	Neither Legislative licensing nor Certification licensing requirements are needed		
Required Knowledge & Skills	<p>You will be assessed to prove your competence in the required skills and knowledge below:</p> <p style="text-align: center;">Single phase input D.C. power supplies</p> <p>Evidence shall show an understanding of single phase input D.C. power supplies, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:</p> <p>T1 OH & S:</p>		

<p>Required Knowledge & Skills</p>	<ul style="list-style-type: none"> • Apply safe working practices and relevant Standards, Codes and Regulations. <p>T2 Power supplies operating principles and applications:</p> <ul style="list-style-type: none"> • Power supply function • Block diagram identifying each sub-system • Expected waveforms in a power supply • Constant Voltage • Constant Current <p>T3 D.C. rectification circuits:</p> <ul style="list-style-type: none"> • Junction diode characteristics • Transformer turns ratio and losses • Half wave and full wave rectifiers (centre-tap and bridge) • Dual rail supply <p>T4 Filter Circuits:</p> <ul style="list-style-type: none"> • Capacitive and inductive filters (capacitor filter, LC filter, CR filter and filter faults) • Ripple • Voltage doublers • Series and shunt Clipper and clamping circuits <p>T5 Zener diode regulators:</p> <ul style="list-style-type: none"> • Zener shunt regulator circuit • Simple, series and shunt transistor regulators • Load and line regulation definitions • Operating parameters and data sheets • Operation of different types of regulated power supplies <p>T6 Three terminal linear regulator circuits:</p> <ul style="list-style-type: none"> • Need for regulation • Three terminal regulator characteristics • Short circuit protection • Line and load regulation • Regulated power efficiency • Remote voltage sensing • Linear regulators using integrated circuits <p>T7 Electronic testing and measuring devices and techniques:</p> <ul style="list-style-type: none"> • Test/measuring devices and their application - analogue and digital multimeters, voltage and digital testers, signal generators and oscilloscopes • Connection of test/measuring devices into a circuit encompassing: <ul style="list-style-type: none"> • safety procedures • circuit arrangement of test/measuring devices • Taking readings • Storage, maintenance and care of test/measuring devices <p>T8 D.C. Power supply testing and fault finding:</p> <ul style="list-style-type: none"> • Rectifier diode faults • Zener diode faults • Three terminal regulator faults • Purpose and benefits of different types of regulated power supplies • Voltage current waveforms at different points within a power supply • Emerging technologies
<p>Assessment criteria</p>	<p>You will be assessed against the following criteria to establish your competence in the unit:</p> <p>Event 1: Practical Test 1, checks the required skill adequacy of the student to demonstrate his/her competency in working with Linear Power supplies. The student's task is to build a linear power supply and perform the required fault-finding and repairs to make the linear power supply operational.</p> <p>Event 2: Theory Exam 1, tests the required student's knowledge on linear power supplies as per the required knowledge contained in the topics delivered on the term. Exam 1 will be conducted during class time and it will contain thirty-five (35) multiple choice and five (5) calculation questions. To achieve competency in Exam 1, the student must answer correctly 50% of the test.</p>

	<p>You will be required to successfully assemble, fault-finding and achieve a fully working power supply and obtain 50% of the theory test to demonstrate your competence in unit H111A.</p>																		
<p>Assessment methods & schedule</p>	<p>Assessment of this Learning Specification will be based on the evidence that you provide using 2 or more of the following, as prescribed by your local Institute/ College teaching staff:</p> <ul style="list-style-type: none"> • Observation of skills in practical exercises and • Questioning of knowledge using pen and paper tests, essays, oral tests and/or interviews <p>You will be required to complete all assessments for this unit to demonstrate your competence in this unit.</p> <p>Sufficient evidence must be collected, using local assessment methods/tools identified in the Assessment Table below to demonstrate both the student's:</p> <ol style="list-style-type: none"> 1. Successful Performance of the Competency, by meeting the requirements in the Work Performance Specification, and an 2. Understanding of the required skills and knowledge (KS01-H115A), by meeting the requirements in the Learning Specification/s. <table border="1"> <thead> <tr> <th>Assessment event no.</th> <th>Assessment Name/ Method</th> <th>Assessment date</th> <th>Assessment duration</th> <th>Assessment venue</th> <th>Assessment outcome</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Practical Test</td> <td></td> <td></td> <td></td> <td>Satisfactory/Not yet satisfactory</td> </tr> <tr> <td>2</td> <td>Theory Exam</td> <td></td> <td></td> <td></td> <td>Satisfactory/Not yet satisfactory</td> </tr> </tbody> </table>	Assessment event no.	Assessment Name/ Method	Assessment date	Assessment duration	Assessment venue	Assessment outcome	1	Practical Test				Satisfactory/Not yet satisfactory	2	Theory Exam				Satisfactory/Not yet satisfactory
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1	Practical Test				Satisfactory/Not yet satisfactory														
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<p>Reporting assessment outcomes</p>	<p>Your Transcript of Academic Record lists all of your results in your study to date.</p> <p>"This is an ungraded unit; therefore your academic result will be recorded and reported to you as Competent (AC) or Not Yet Competent (NC)".</p> <p>If you achieved competency in this unit but are unable to finish the qualification, you will receive a Transcript of Academic Record showing only the units you completed. A Statement of Attainment for the unit/units you have successfully completed will also be provided. Please contact the Head Teacher to initiate this process.</p> <p>Recognition and credit transfers: you can apply to have your previous study, work and/or life experiences recognised.</p> <p>Please see Recognition for previous learning and experience for further information.</p>																		
<p>Resources required for assessments</p>	<p>This unit is assessed using specific resources/tools:</p> <p>Learner Resource Manual Students don't need to purchase any Learner Resource Manual :</p> <p>Principal References It is advised that students have access to the following reference books as the main references:</p> <ol style="list-style-type: none"> 1. <i>Understanding DC power supplies.</i> Author: David, Barry Publisher: Prentice Hall 2. <i>Exploring Electronic Devices</i> Author: Mark E. Hazen Publisher: Saunders College 3. <i>Electronic Devices</i> Author: Floyd, Thomas. Publisher: Merrill Publishing 																		

	<p>4. <i>Introductory Electronic Devices & Circuits</i> Author: Paynter, Robert Publisher: Prentice Hall</p> <p>You will also be provided with</p> <ul style="list-style-type: none"> • Access to a simulated environment containing information similar to that which you may encounter in a workplace. • Access to computer systems for real time assessments sufficient to enable participation in the assessment process. <p>Other Resources</p> <p>To complete this unit successfully you should bring the following equipment to class with you:</p> <ul style="list-style-type: none"> • pens, pencils, notepaper, soft rubber eraser • scientific calculator Casio fx-100AU PLUS • hooking Wire single core AWG 22 (Hartland Cables P/N HC0069) • USB memory Stick
<p>Assessment feedback, review or appeals</p>	<p>Your teacher will provide feedback no later than three (3) weeks after all assessment activities have been conducted.</p> <p>If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.</p> <p>You will have three weeks from the date you receive your results in which to make an appeal and request a review.</p> <p>You will receive a response within ten working days after receipt of the request.</p>
<p>Assessment guidelines</p>	<p>You must submit assessment work and attended scheduled assessments on the required dates.</p> <ul style="list-style-type: none"> • If you miss an assessment you must discuss the issue of the missed assessment with your teacher within <u>seven days</u>, or at your first class attendance after the assessment, whichever occurs first. • If you miss an exam, or arrive late by more than 30 minutes after the commencement of the exam, due to illness or circumstances beyond your control, you should contact the teacher of this unit. • If you are deemed unsatisfactory in an assessment event you will be eligible to receive one (1) additional reattempt to demonstrate competence. Speak to your teacher for further information. • If you engage in cheating such as copying, colluding with another person, using unauthorised notes, or allowing another person to copy your work, you will be liable for disciplinary action as per Student Discipline Policy - Whatever the form of assessment, it is essential that the work you are assessed on is your own. To validate the authenticity of your submitted work it may be checked used anti plagiarism software in addition it may be stored for future plagiarism checking. <p>We provide learners with every reasonable opportunity to have their work assessed and where possible each case of learner absence from an assessment will be considered on an individual basis. However, where there are no extenuating circumstances, the following penalties apply:</p> <ul style="list-style-type: none"> • where the results of the unit are recorded in marks, when the assessment is up to seven days late the result achieved by the learner is reduced by 15% • when the assessment is more than seven days late, the result recorded is recorded as "not yet competent" • for non-attendance at an assessment on a negotiated date, the result is recorded as "not yet competent".

	You can view information related to assessment in <i>Every Student's Guide to Assessment</i>
Assessment: reasonable adjustments	<p>If you are a student with a disability it is important for you to indicate this on your enrolment form and make contact with the Teacher / Consultant for Students with a Disability in your Institute for further information. If possible, this should happen before you enrol. They will provide you with appropriate information about the range of units available. Teachers and teacher consultants will arrange for students with a disability to be given reasonable adjustment in assessment on an individual needs basis.</p> <p>Teachers may make reasonable allowances for the learners, based on the evidence provided, in accordance with the Assessment Policy - This may relate to the timeframe for submitting/attempting the assessment task or to an alternative form of assessment evidence to be used for assessing the learner's level of achievement.</p>

Teacher Contact Details		

STUDENT ASSESSMENT GUIDE – UNIT OF COMPETENCY

Qualification	Engineering Technology – Electrical		
Unit of competency	UEECD0004 Apply material science to solving electrotechnology engineering problems		
Unit Descriptor	This unit covers the application of materials for a specific purpose in electrotechnology. It encompasses working safely, knowledge of materials science including classifications, characteristics and any impact a material may have on health and the environment, the processes of corrosion and degradation, how particular materials are used, solving electrotechnology problems involving of materials for a particular application and documenting justification for such solutions.		
Prerequisites	UEENEEE101A/UEECD0007 Apply Occupational Health and Safety regulations, codes and practices in the workplace		
Assessment criteria	<p>UEECD0004 Materials science in electrotechnology Evidence shall show that knowledge has been acquired of material science in electrotechnology. Summary of topics.</p> <ul style="list-style-type: none"> • Classification, nature and physical properties of materials used in electrotechnology • Dielectric strength and dielectric breakdown, examples to include applications using solids, liquids, gases and vacuum • Conductors and semiconductors • Chemical effects on materials • Material processing and manufacturing • Environment and health issues 		
Assessment methods	You will be required to complete all assessments for this unit to demonstrate your competence in this unit:		
	Assessment no.	Assessment method	Assessment grading
	1	Research Project 1	[Satisfactory/Not Yet Satisfactory]
	2	Research Project 2	[Satisfactory/Not Yet Satisfactory]
Assessment schedule	You will be assessed for this unit as per the following schedule:		
	Assessment no.	Assessment date	Assessment venue
	1		Industrial Control Lab
	2		Industrial Control Lab
Reporting assessment outcomes	Your Transcript of Academic Record lists all of your results in your study to date. “This is an ungraded unit; therefore your result will be recorded and reported to you as Competent (AC) or Not Yet Competent (NC) ”.		

	<p>If you have achieved competency in this unit but are unable to finish the qualification, you will receive a Transcript of Academic Record showing only the units you have completed. You will also receive a Statement of Attainment for the unit/units you have successfully completed.</p> <p>Recognition and credit transfers: you can apply to have your previous study, work and/or life experiences recognised. Recognition of Prior Learning will be determined according to Recognition Policy.</p>
<p>Resources required for assessments</p>	<p>This unit is assessed using specific resources/tools:</p> <p>You will be provided</p> <ul style="list-style-type: none"> • access to a simulated environment • access to workplace documents, information and resources (such as compliance obligations, enterprise plans, work responsibilities) <p>You are required to bring in the following for the assessments:</p> <p>N/A</p>
<p>Assessment feedback, review or appeals</p>	<p>Your teacher will provide feedback no later than three (3) weeks after all assessment activities have been conducted.</p> <p>If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.</p> <p>You will have three weeks from the date you receive your results in which to make an appeal and request a review.</p> <p>You will receive a response within ten working days after receipt of the request.</p>
<p>Assessment conditions</p>	<p>You must submit assessment work and attend scheduled assessments on the required dates.</p> <ul style="list-style-type: none"> ○ If you miss an assessment you must discuss the issue of the missed assessment with your teacher within <u>seven days</u>, or at your first class attendance after the assessment, whichever occurs first. ○ If you miss an exam, or arrive late by more than 30 minutes after the commencement of the exam, due to illness or circumstances beyond your control, you should contact the teacher of this unit. ○ If you engage in cheating such as copying, colluding with another person, using unauthorised notes, or allowing another person to copy your work, you will be liable for disciplinary action as per Student Discipline Policy. Whatever the form of assessment, it is essential that the work you are assessed on is your own. <p>We provide learners with every reasonable opportunity to have their work assessed and where possible each case of learner absence from an assessment will be considered on an individual basis. However, where there are no extenuating circumstances, the following penalties apply:</p> <ul style="list-style-type: none"> ○ where the results of the unit are recorded in marks, when the assessment is up to seven days late the result achieved by the learner is reduced by 15% ○ when the assessment is more than seven days late, the result recorded is recorded as “not yet competent” ○ for non-attendance at an assessment on a negotiated date, the result is recorded as “not yet competent”.

Assessment: reasonable adjustments	<p>If you are a student with a disability it is important for you to indicate this on your enrolment form and make contact with the Teacher / Consultant for Students with a Disability in your Institute for further information. If possible, this should happen before you enrol. They will provide you with appropriate information about the range of units available. Teachers and teacher consultants will arrange for students with a disability to be given reasonable adjustment in assessment on an individual needs basis.</p> <p>Teachers may make reasonable allowances for the learners, based on the evidence provided, in accordance with the Assessment Policy and guidelines. This may relate to the timeframe for submitting/attempting the assessment task or to an alternative form of assessment evidence to be used for assessing the learner's level of achievement.</p>
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Contact Details		

Student Assessment Guide (Unit of Competency)

(Streamlined Training Package)

Faculty	C.E.T.	College	
Teaching Section	Electrical Engineering		
Qualification Number and Name	Advanced Diploma of Engineering Technology - Electrical Advanced Diploma of Electrical Engineering Advanced Diploma of Engineering Technology - Electronics		
Unit of Competency Number and Name	UEECD0005 -Electrotechnology Engineering Physics		
Application	This unit covers the law of physics and how they apply to solving electrotechnology related problems. It encompasses working safely, knowledge of measurements of physical phenomena, linear and angular motion, harmonic motion, wave theory, optics, acoustics and heat capacity and transfer, use of measurement techniques, solving physics related problems and documenting justification for such solutions.		
Prerequisites	<p>Competencies: Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed. UEENEEE101A /CD0007Apply Occupational Health and Safety regulations, codes and practicesin the workplace</p> <p>Literary and Numeracy: Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 "Literacy and Numeracy"</p>		
Licensing, Legislative or Certification requirements	None		
Required Skills & Knowledge	<p>All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.</p> <p>You will be assessed to prove your competence in the required skills and knowledge below:</p> <p>UEECD0005 - Electrotechnology Engineering Physics</p> <p>Evidence shall show an understanding of electrotechnology engineering maths to an extent indicated by the following aspects:</p> <p>T1 Measurement encompassing</p> <ul style="list-style-type: none"> • SI units in measurement of physical phenomena • Uncertainty and tolerance <p>T2 Linear motion</p> <p>T3 Angular motion</p> <p>T4 Simple harmonic motion and vibration</p> <p>T5 Wave theory</p> <ul style="list-style-type: none"> • Interference • Diffraction <p>T6 Electromagnetic waves and propagation</p> <p>T7 Optics</p> <ul style="list-style-type: none"> • Mirrors and lenses • Optical fibre 		

Required Skills & Knowledge	<p>T8 Acoustics and ultrasonics T9 Heat capacity and heat transfer T1 Measurement encompassing</p> <ul style="list-style-type: none"> • SI units in measurement of physical phenomena • Uncertainty and tolerance <p>T2 Linear motion T3 Angular motion T4 Simple harmonic motion and vibration T5 Wave theory</p> <ul style="list-style-type: none"> • Interference • Diffraction <p>T6 Electromagnetic waves and propagation T7 Optics</p> <ul style="list-style-type: none"> • Mirrors and lenses • Optical fibre <p>T8 Acoustics and ultrasonics T9 Heat capacity and heat transfer</p> <ul style="list-style-type: none"> • Fluid power 																							
Assessment criteria	<p>Sufficient evidence must be collected, using local assessment methods/tools identified in the Assessment Table below to demonstrate both the student's:</p> <ol style="list-style-type: none"> 1. Successful Performance of the Competency, by meeting the requirements in the Work Performance Specification, and an 2. Understanding of the required skills and knowledge (KS01-EE082A), by meeting the requirements in the Learning Specification/s. <p>You will be assessed against the following criteria to establish your competence in the unit:</p> <p>Event 1: Theory Test 1. Short answers and calculations based on topics T1 to T6.</p> <p>Event 2: Theory Test 2. Short answers and calculations based on topics T7 to T9.</p>																							
Assessment methods & schedule	<table border="1"> <thead> <tr> <th>Assessment event no.</th> <th>Assessment Name/ Method</th> <th>Assessment date</th> <th>Assessment duration</th> <th>Assessment venue</th> <th>Assessment outcome</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Theory Test 1</td> <td></td> <td></td> <td></td> <td>S/NS</td> </tr> <tr> <td>2</td> <td>Theory Test 2</td> <td></td> <td></td> <td></td> <td>S/NS</td> </tr> </tbody> </table>	Assessment event no.	Assessment Name/ Method	Assessment date	Assessment duration	Assessment venue	Assessment outcome	1	Theory Test 1				S/NS	2	Theory Test 2				S/NS					
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Reporting assessment outcomes	<p>Your Transcript of Academic Record lists all of your results in your study to date.</p> <p>"This is an ungraded unit; therefore your academic result will be recorded and reported to you as Competent (AC) or Not Yet Competent (NC)".</p> <p>If you achieved competency in this unit but are unable to finish the qualification, you will receive a Transcript of Academic Record showing only the units you completed.</p> <p>A Statement of Attainment for the unit/units you have successfully completed will also be provided. Please contact the Head Teacher to initiate this process.</p> <p>Recognition and credit transfers: you can apply to have your previous study, work and/or life experiences recognised. Recognition of Prior Learning will be determined according to Recognition Policy.</p> <p>Please see Recognition for previous learning and experience for further information.</p>																							
Resources required for assessments	<p>You are required to bring in the following for the assessments: Calculator, Pen.</p>																							

<p>Assessment feedback, review or appeals</p>	<p>Your teacher will provide feedback no later than three (3) weeks after all assessment activities have been conducted.</p> <p>If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.</p> <p>You will have three weeks from the date you receive your results in which to make an appeal and request a review.</p> <p>You will receive a response within ten working days after receipt of the request.</p>
<p>Assessment guidelines</p>	<p>You must submit assessment work and attended scheduled assessments on the required dates.</p> <ul style="list-style-type: none"> • If you miss an assessment you must discuss the issue of the missed assessment with your teacher within <u>seven days</u>, or at your first class attendance after the assessment, whichever occurs first. • If you miss an exam, or arrive late by more than 30 minutes after the commencement of the exam, due to illness or circumstances beyond your control, you should contact the teacher of this unit. • If you are deemed unsatisfactory in an assessment event you will be eligible to receive one (1) additional reattempt to demonstrate competence. Speak to your teacher for further information. • For final examinations in Category A or B (exams that are centrally set and timetabled) you have 10 working days. Your teacher will inform you about the revised examination date which may not be until the following year. • If you engage in cheating such as copying, colluding with another person, using unauthorised notes, or allowing another person to copy your work, you will be liable for disciplinary action as per Student Discipline Policy Whatever the form of assessment, it is essential that the work you are assessed on is your own. To validate the authenticity of your submitted work it may be checked used anti plagiarism software in addition it may be stored for future plagiarism checking. <p>We provide learners with every reasonable opportunity to have their work assessed and where possible each case of learner absence from an assessment will be considered on an individual basis. However, where there are no extenuating circumstances, the following penalties apply:</p> <ul style="list-style-type: none"> • where the results of the unit are recorded in marks, when the assessment is up to seven days late the result achieved by the learner is reduced by 15% • when the assessment is more than seven days late, the result recorded is recorded as "not yet competent" • for non-attendance at an assessment on a negotiated date, the result is recorded as "not yet competent".
<p>Assessment: reasonable adjustments</p>	<p>If you are a student with a disability it is important for you to indicate this on your enrolment form and make contact with the Teacher / Consultant for Students with a Disability in your Institute for further information. If possible, this should happen before you enrol. They will provide you with appropriate information about the range of units available. Teachers and teacher consultants will arrange for students with a disability to be given reasonable adjustment in assessment on an individual needs basis.</p> <p>Teachers may make reasonable allowances for the learners, based on the evidence provided, in accordance with the Assessment Policy - This may relate to the timeframe for submitting/attempting the assessment task or to an alternative form of assessment evidence to be used for assessing the learner's level of achievement.</p>

**Teacher
Contact
Details**

Student Assessment Guide (Unit of Competency)

(Streamlined Training Package)

Faculty	C.E.T.	College																																	
Teaching Section	Electrical Engineering																																		
Qualification Number and Name	Advanced Diploma of Electrical Engineering Advanced Diploma of Engineering Technology - Electrical Advanced Diploma of Engineering Technology - Electronics																																		
Unit of Competency Number and Name	UEEEL0041 Develop engineering solution for synchronous machine																																		
Application	<p>This unit covers developing engineering solutions to resolve problems with synchronous machines and their controls. It encompasses working safely, apply extensive knowledge of synchronous machine operation, construction and their application, gathering and analysing data, applying problem solving techniques, developing and documenting solutions and alternatives.</p> <p>..</p>																																		
Prerequisites	<p>Granting competency in this unit shall be made only after competency in the following unit(s) or their superseded units in UEE20 Training Package as per mapping table http://www.highlightcomputer.com/UEE11-20Mapping.pdf has/have been confirmed.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">UEENEEG149A</td> <td>Provide engineering solutions to problems in complex polyphase power circuits</td> </tr> <tr> <td>UEENEEE125A</td> <td>Provide engineering solutions for problems in complex multiple path circuit</td> </tr> <tr> <td>UEENEEE126A</td> <td>Provide solutions to basic engineering computational problems</td> </tr> <tr> <td>AND</td> <td></td> </tr> <tr> <td>UEENEEE129A</td> <td>Solve electrotechnical engineering problems</td> </tr> <tr> <td>OR</td> <td></td> </tr> <tr> <td>UEENEEE101A</td> <td>Apply Occupational Health and Safety regulations, codes and practices in the workplace</td> </tr> <tr> <td>UEENEEE104A</td> <td>Solve problems in d.c. circuits</td> </tr> <tr> <td>UEENEEG101A</td> <td>Solve problems in electromagnetic devices and related circuits</td> </tr> <tr> <td>OR</td> <td></td> </tr> <tr> <td>UEENEEH114A</td> <td>Troubleshoot resonance circuits in an electronic apparatus</td> </tr> <tr> <td>UEENEEE101A</td> <td>Apply Occupational Health and Safety regulations, codes and practices in the workplace</td> </tr> <tr> <td>AND</td> <td></td> </tr> <tr> <td>UEENEEE104A</td> <td>Solve problems in d.c. circuits</td> </tr> <tr> <td>OR</td> <td></td> </tr> <tr> <td>UEENEEH169A</td> <td>Solve problems in basic electronic circuits</td> </tr> </table>			UEENEEG149A	Provide engineering solutions to problems in complex polyphase power circuits	UEENEEE125A	Provide engineering solutions for problems in complex multiple path circuit	UEENEEE126A	Provide solutions to basic engineering computational problems	AND		UEENEEE129A	Solve electrotechnical engineering problems	OR		UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	UEENEEE104A	Solve problems in d.c. circuits	UEENEEG101A	Solve problems in electromagnetic devices and related circuits	OR		UEENEEH114A	Troubleshoot resonance circuits in an electronic apparatus	UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	AND		UEENEEE104A	Solve problems in d.c. circuits	OR		UEENEEH169A	Solve problems in basic electronic circuits
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Licensing,	<p>The skills and knowledge described in this unit require a license to practice in the workplace for work involving direct access to plant and equipment connected to installation wiring at voltage above 50 V a.c. or 120 V d.c. However other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.</p>																																		

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.
2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.

Required Knowledge & Skills

You will be assessed to prove your competence in the required skills and knowledge below:

Synchronous machine diagnostics

Evidence shall show an understanding of developing engineering solutions for synchronous machine problems to an extent indicated by the following aspects:

T1 a.c. generators – construction, types and cooling encompassing:

- construction of stator and rotor windings
- rotor construction (cylindrical and salient pole)
- advantages of rotating field construction
- excitation methods
- cooling methods
- prime movers

T2 a.c. generators – operating principles and characteristics encompassing:

- a.c. generator equivalent circuits (synchronous reactance and resistance components)
- tests – open circuit, short circuit, stator impedance
- voltage regulation, island generator's terminal voltage load power factor
- determination of excitation voltage and load angle

T3 Synchronising a.c. generators encompassing:

- conditions for synchronising (infinite bus)
- methods for synchronising (lamp methods, synchroscope)
- alternator load sharing, parallel operation

T4 a.c. generators power, torque and efficiency encompassing:

- power input, input torque, speed
- power losses
- output power, load power factor, rotor angle, pu power
- efficiency
- performance chart interpretation

T5 Voltage regulation (AVR) encompassing:

- need for AVR's
- features of AVR's
- effects of rotor inductance
- connections of AVRs
- operation of AVRs

T6 a.c. generator operational stability encompassing:

- power output, VAR effects, rotor angle, excitation
- control of VAR (OLTC transformers)
- voltage dependant nature of stability
- critical clearance angle of a.c. generator
- stability limits

T7 a.c. generator protection encompassing:

- restricted, unrestricted primary, back up and duplicated protection
- overcurrent, short circuit, differential, reverse power, load unbalance, rotor overload, loss-of-field, rotor earth fault, station earth fault, under frequency protection
- external fault protection

T8 Induction generator encompassing:

- types operating principles, characteristics
- excitation methods
- losses and efficiency
- synchronising and paralleling

T9 Three phase synchronous motors encompassing:

- construction – rotor, stator, windings
- excitation methods
- operating principles (equivalent circuits, synchronous impedance)
- hunting and stability limits
- power factor correction

Required Knowledge & Skills

	<ul style="list-style-type: none"> <input type="checkbox"/> paralleling and synchronisation techniques <input type="checkbox"/> starting methods <input type="checkbox"/> braking methods
<p>Assessment criteria</p>	<p>Before the critical aspects of evidence are considered all prerequisites must be met.</p> <p>Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:</p> <ul style="list-style-type: none"> • A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to: <ul style="list-style-type: none"> • Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement • Apply sustainable energy principles and practices as specified in the performance criteria and range statement • Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements. • Demonstrate an appropriate level of skills enabling employment • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures. • Demonstrated consistent performance across a representative range of contexts from the prescribed items below: <ul style="list-style-type: none"> • Applying OHS practices in the workplace as described in 8) and including: <ol style="list-style-type: none"> a. Preparing to enter the workplace including, the use of work permits and clearances and isolation permissions.Planning estimation work effectively. b. Understanding and following risk control safe work methods. c. Applying work procedures and instructions as they apply to risk control measures. d. Dealing with accidents and emergencies within the scope of responsibility. e. Participation in consultation processes, identifying hazards and implementing and monitoring control measures. <p>Dealing with unplanned events</p>
<p>Assessment methods & schedule</p>	<p>Assessment of this Learning Specification will be based on the evidence that you provide using 2 or more of the following, as prescribed by your local Institute/ College teaching staff:</p> <ul style="list-style-type: none"> • Observation of skills in practical exercises and • Questioning of knowledge using pen and paper tests, essays, oral tests and/or interviews <p>You will be required to complete all assessments for this unit to demonstrate your competence in this unit.</p> <p>Sufficient evidence must be collected, using local assessment methods/tools identified in the Assessment Table below to demonstrate both the student's:</p> <ol style="list-style-type: none"> 1. Successful Performance of the Competency, by meeting the requirements in the Work Performance Specification, and an 2. Understanding of the required skills and knowledge ,by meeting the requirements in the Learning Specification/s.

	Assessment event no.	Assessment Name/ Method	Assessment date	Assessment duration	Assessment venue	Assessment outcome
	1	Practical Test				Satisfactory/Not yet satisfactory
	2	Theory Exam				Satisfactory/Not yet satisfactory
Reporting assessment outcomes	<p>Your Transcript of Academic Record lists all of your results in your study to date.</p> <p>"This is an ungraded unit; therefore your academic result will be recorded and reported to you as Competent (AC) or Not Yet Competent (NC)".</p> <p>If you achieved competency in this unit but are unable to finish the qualification, you will receive a Transcript of Academic Record showing only the units you completed. A Statement of Attainment for the unit/units you have successfully completed will also be provided. Please contact the Head Teacher to initiate this process.</p> <p>Recognition and credit transfers: you can apply to have your previous study, work and/or life experiences recognised. Recognition of Prior Learning will be determined according to Recognition Policy.</p> <p>Please see Recognition for previous learning and experience for further information.</p>					
Resources required for assessments	<p>This unit is assessed using specific resources/tools:</p> <p>Learner Resource Manual Students don't need to purchase any Learner Resource Manual :</p> <p>Principal References It is advised that students have access to the following reference books as the main references:</p> <p><i>Electrical Trade Practice (Latest Edition)</i> <i>Australian Electrical Wiring (Latest Edition)</i> <i>Electrical Machines, Drives & Power Systems,</i> <i>Synchronous Machines & Drives</i> by AUSTIN HUGHES AND BILL DRURY</p> <p>You will also be provided with</p> <ul style="list-style-type: none"> • Access to a simulated environment containing information similar to that which you may encounter in a workplace. • Access to computer systems for real time assessments sufficient to enable participation in the assessment process. <p>Other Resources To complete this unit successfully you should bring the following equipment to class with you:</p> <ul style="list-style-type: none"> • pens, pencils, notepaper, soft rubber eraser • scientific calculator Casio fx-100AU PLUS • USB memory Stick 					
Assessment feedback, review or appeals	<p>Your teacher will provide feedback no later than three (3) weeks after all assessment activities have been conducted.</p> <p>If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.</p> <p>You will have three weeks from the date you receive your results in which to make an appeal and request a review.</p> <p>You will receive a response within ten working days after receipt of the request.</p>					

Assessment guidelines	<p>You must submit assessment work and attended scheduled assessments on the required dates.</p> <ul style="list-style-type: none"> • If you miss an assessment you must discuss the issue of the missed assessment with your teacher within <u>seven days</u>, or at your first class attendance after the assessment, whichever occurs first. • If you miss an exam, or arrive late by more than 30 minutes after the commencement of the exam, due to illness or circumstances beyond your control, you should contact the teacher of this unit. • If you are deemed unsatisfactory in an assessment event you will be eligible to receive one (1) additional reattempt to demonstrate competence. Speak to your teacher for further information. • If you engage in cheating such as copying, colluding with another person, using unauthorised notes, or allowing another person to copy your work, you will be liable for disciplinary action as per Student Discipline Policy - Whatever the form of assessment, it is essential that the work you are assessed on is your own. To validate the authenticity of your submitted work it may be checked used anti plagiarism software in addition it may be stored for future plagiarism checking. <p>We provide learners with every reasonable opportunity to have their work assessed and where possible each case of learner absence from an assessment will be considered on an individual basis. However, where there are no extenuating circumstances, the following penalties apply:</p> <ul style="list-style-type: none"> • where the results of the unit are recorded in marks, when the assessment is up to seven days late the result achieved by the learner is reduced by 15% • when the assessment is more than seven days late, the result recorded is recorded as "not yet competent" • for non-attendance at an assessment on a negotiated date, the result is recorded as "not yet competent".
Assessment: reasonable adjustments	<p>If you are a student with a disability it is important for you to indicate this on your enrolment form and make contact with the Teacher / Consultant for Students with a Disability in your Institute for further information. If possible, this should happen before you enrol. They will provide you with appropriate information about the range of units available. Teachers and teacher consultants will arrange for students with a disability to be given reasonable adjustment in assessment on an individual needs basis. Teachers may make reasonable allowances for the learners, based on the evidence provided, in accordance with the Assessment Policy This may relate to the timeframe for submitting/attempting the assessment task or to an alternative form of assessment evidence to be used for assessing the learner's level of achievement.</p>

Teacher Contact Details		

Student Assessment Guide (Unit of Competency)

(Streamlined Training Package)

Faculty	C.E.T.	College																																	
Teaching Section	Electrical Engineering																																		
Qualification Number and Name	Advanced Diploma of Electrical Engineering Advanced Diploma of Engineering Technology - Electrical Advanced Diploma of Engineering Technology - Electronics																																		
Unit of Competency Number and Name	UEEEL0043 Develop engineering solutions for induction machine																																		
Application	<p>This unit covers developing engineering solutions to resolve problems with induction machines and their controls. It encompasses working safely; apply extensive knowledge of induction machine operation and construction and their application, gathering and analysing data, applying problem solving techniques, developing and documenting solutions and alternatives</p> <p>..</p>																																		
Prerequisites	<p>Granting competency in this unit shall be made only after competency in the following unit(s) or their superseded units in UEE20 Training Package as per mapping table http://www.highlightcomputer.com/UEE11-20Mapping.pdf has/have been confirmed.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">UEENEEG149A</td> <td>Provide engineering solutions to problems in complex polyphase power circuits</td> </tr> <tr> <td>UEENEEE125A</td> <td>Provide engineering solutions for problems in complex multiple path circuit</td> </tr> <tr> <td>UEENEEE126A</td> <td>Provide solutions to basic engineering computational problems</td> </tr> <tr> <td>AND</td> <td></td> </tr> <tr> <td>UEENEEE129A</td> <td>Solve electrotechnical engineering problems</td> </tr> <tr> <td>OR</td> <td></td> </tr> <tr> <td>UEENEEE101A</td> <td>Apply Occupational Health and Safety regulations, codes and practices in the workplace</td> </tr> <tr> <td>UEENEEE104A</td> <td>Solve problems in d.c. circuits</td> </tr> <tr> <td>UEENEEG101A</td> <td>Solve problems in electromagnetic devices and related circuits</td> </tr> <tr> <td>OR</td> <td></td> </tr> <tr> <td>UEENEEH114A</td> <td>Troubleshoot resonance circuits in an electronic apparatus</td> </tr> <tr> <td>UEENEEE101A</td> <td>Apply Occupational Health and Safety regulations, codes and practices in the workplace</td> </tr> <tr> <td>AND</td> <td></td> </tr> <tr> <td>UEENEEE104A</td> <td>Solve problems in d.c. circuits</td> </tr> <tr> <td>OR</td> <td></td> </tr> <tr> <td>UEENEEH169A</td> <td>Solve problems in basic electronic circuits</td> </tr> </table>			UEENEEG149A	Provide engineering solutions to problems in complex polyphase power circuits	UEENEEE125A	Provide engineering solutions for problems in complex multiple path circuit	UEENEEE126A	Provide solutions to basic engineering computational problems	AND		UEENEEE129A	Solve electrotechnical engineering problems	OR		UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	UEENEEE104A	Solve problems in d.c. circuits	UEENEEG101A	Solve problems in electromagnetic devices and related circuits	OR		UEENEEH114A	Troubleshoot resonance circuits in an electronic apparatus	UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace	AND		UEENEEE104A	Solve problems in d.c. circuits	OR		UEENEEH169A	Solve problems in basic electronic circuits
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	<p>Note:</p> <ol style="list-style-type: none"> 1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation. 2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting and risk safety measures.
<p>Required Knowledge & Skills</p>	<p>You will be assessed to prove your competence in the required skills and knowledge below:</p> <ul style="list-style-type: none"> <input type="checkbox"/> excitation methods <p>Induction machines diagnostics</p> <p>Evidence shall show an understanding of developing engineering solutions for induction motor problems to an extent indicated by the following aspects:</p> <p>T1 Operating principles of polyphase induction motors encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> rotating magnetic field torque slip <input type="checkbox"/> MMF relationships <input type="checkbox"/> Leakage fluxes <p>T2 Construction of polyphase induction motors encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> squirrel cage motors <input type="checkbox"/> slip-ring motors <input type="checkbox"/> construction considerations in minimisation of tooth locking <p>T3 Speed-torque relationships in induction motors encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> maximum torque <input type="checkbox"/> torque – slip relationships <input type="checkbox"/> squirrel cage rotor types <input type="checkbox"/> power flow in the motors <input type="checkbox"/> power distribution <input type="checkbox"/> torque units <input type="checkbox"/> slip ring rotors <p>T4 Induction motor performance testing encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> no-load tests <p>locked rotor tests</p> <ul style="list-style-type: none"> <input type="checkbox"/> development of motor equivalent circuit from test results <input type="checkbox"/> analysis of motor performance using circle diagrams <p>T5 Induction motor starters encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> starting requirements <input type="checkbox"/> type of starters <input type="checkbox"/> starting torque <input type="checkbox"/> starting dynamics <input type="checkbox"/> static friction <input type="checkbox"/> mechanical loads <input type="checkbox"/> starting duration <p>T6 Reduced voltage starting encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> starting dynamics <input type="checkbox"/> change over conditions <input type="checkbox"/> starting duration <input type="checkbox"/> acceleration curves <p>T7 Speed control of induction motors encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> constant torque, constant power concepts <input type="checkbox"/> torque-flux-voltage relationships <input type="checkbox"/> rotor resistance control <input type="checkbox"/> stator impedance control <input type="checkbox"/> variable frequency control <p>T8 Braking of induction motors encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> electrical braking systems (plugging, d.c. dynamic, regenerative, capacitor-magnetic) <input type="checkbox"/> mechanical braking systems (mechanical drum, demag, eddy current) <p>T9 Motor protection encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> overload <input type="checkbox"/> earth fault <input type="checkbox"/> phase failure

	<p>T10 Motor selection criteria and RMS rating</p> <p>T11 Induction motor maintenance/repair encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> routine maintenance schedules <input type="checkbox"/> type of repairs (mechanical, electrical) <p>T12 Single phase induction motors encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> operating principles (especially RMF) <input type="checkbox"/> construction types <p>speed-torque relationships</p> <ul style="list-style-type: none"> <input type="checkbox"/> testing
<p>Assessment criteria</p>	<p>Before the critical aspects of evidence are considered all prerequisites must be met.</p> <p>Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE20 Evidence shall also comprise:</p> <ul style="list-style-type: none"> • A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to: <ul style="list-style-type: none"> • Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement • Apply sustainable energy principles and practices as specified in the performance criteria and range statement • Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements. • Demonstrate an appropriate level of skills enabling employment • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures. • Demonstrated consistent performance across a representative range of contexts from the prescribed items below: <ul style="list-style-type: none"> • Applying OHS practices in the workplace as described in 8) and including: <ol style="list-style-type: none"> a. Preparing to enter the workplace including, the use of work permits and clearances and isolation permissions.Planning estimation work effectively. b. Understanding and following risk control safe work methods. c. Applying work procedures and instructions as they apply to risk control measures. d. Dealing with accidents and emergencies within the scope of responsibility. e. Participation in consultation processes, identifying hazards and implementing and monitoring control measures. <p>Dealing with unplanned events</p>
<p>Assessment methods & schedule</p>	<p>Assessment of this Learning Specification will be based on the evidence that you provide using 2 or more of the following, as prescribed by your local Institute/ College teaching staff:</p> <ul style="list-style-type: none"> • Observation of skills in practical exercises and • Questioning of knowledge using pen and paper tests, essays, oral tests and/or interviews <p>You will be required to complete all assessments for this unit to demonstrate your competence in this unit.</p> <p>Sufficient evidence must be collected, using local assessment methods/tools identified in the Assessment Table below to demonstrate both the student's:</p> <p>1. Successful Performance of the Competency, by meeting the requirements in the Work Performance Specification, and an</p>

2. **Understanding of the required skills and knowledge** by meeting the requirements in the Learning Specification/s.

Assessment event no.	Assessment Name/ Method	Assessment date	Assessment duration	Assessment venue	Assessment outcome
1	Practical Test				Satisfactory/Not yet satisfactory
2	Theory Exam				Satisfactory/Not yet satisfactory

Reporting assessment outcomes

Your Transcript of Academic Record lists all of your results in your study to date.

"This is an ungraded unit; therefore your academic result will be recorded and reported to you as **Competent (AC)** or **Not Yet Competent (NC)**".

If you achieved competency in this unit but are unable to finish the qualification, you will receive a Transcript of Academic Record showing only the units you completed. A **Statement of Attainment** for the unit/units you have successfully completed will also be provided. Please contact the Head Teacher to initiate this process.

Recognition and credit transfers: you can apply to have your previous study, work and/or life experiences recognised.

Please see [Recognition for previous learning and experience](#) for further information.

Resources required for assessments

This unit is assessed using specific resources/tools:

Learner Resource Manual

Students don't need to purchase any Learner Resource Manual :

Principal References

It is advised that students have access to the following reference books as the main references:

- Electrical Trade Practice (Latest Edition)*
- Australian Electrical Wiring (Latest Edition)*
- Electrical Machines, Drives & Power Systems,*
- Induction Machines & Drives* by AUSTIN HUGHES AND BILL DRURY
- Electrical Machines Diagnosis* by Jean-Claude Trigeassou

You will also be provided with

- Access to a simulated environment containing information similar to that which you may encounter in a workplace.
- Access to computer systems for real time assessments sufficient to enable participation in the assessment process.

Other Resources

To complete this unit successfully you should bring the following equipment to class with you:

- pens, pencils, notepaper, soft rubber eraser
- scientific calculator Casio fx-100AU PLUS
- USB memory Stick

Assessment feedback,

Your teacher will provide feedback no later than three (3) weeks after all assessment activities have been conducted.

review or appeals	<p>If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.</p> <p>You will have three weeks from the date you receive your results in which to make an appeal and request a review.</p> <p>You will receive a response within ten working days after receipt of the request.</p>
Assessment guidelines	<p>You must submit assessment work and attended scheduled assessments on the required dates.</p> <ul style="list-style-type: none"> • If you miss an assessment you must discuss the issue of the missed assessment with your teacher within <u>seven days</u>, or at your first class attendance after the assessment, whichever occurs first. • If you miss an exam, or arrive late by more than 30 minutes after the commencement of the exam, due to illness or circumstances beyond your control, you should contact the teacher of this unit. • If you are deemed unsatisfactory in an assessment event you will be eligible to receive one (1) additional reattempt to demonstrate competence. Speak to your teacher for further information. • . • If you engage in cheating such as copying, colluding with another person, using unauthorised notes, or allowing another person to copy your work, you will be liable for disciplinary action as per Student Discipline Policy - Whatever the form of assessment, it is essential that the work you are assessed on is your own. To validate the authenticity of your submitted work it may be checked used anti plagiarism software in addition it may be stored for future plagiarism checking. <p>We provide learners with every reasonable opportunity to have their work assessed and where possible each case of learner absence from an assessment will be considered on an individual basis. However, where there are no extenuating circumstances, the following penalties apply:</p> <ul style="list-style-type: none"> • where the results of the unit are recorded in marks, when the assessment is up to seven days late the result achieved by the learner is reduced by 15% • when the assessment is more than seven days late, the result recorded is recorded as "not yet competent" • for non-attendance at an assessment on a negotiated date, the result is recorded as "not yet competent".
Assessment: reasonable adjustments	<p>If you are a student with a disability it is important for you to indicate this on your enrolment form and make contact with the Teacher / Consultant for Students with a Disability in your Institute for further information. If possible, this should happen before you enrol. They will provide you with appropriate information about the range of units available. Teachers and teacher consultants will arrange for students with a disability to be given reasonable adjustment in assessment on an individual needs basis.</p> <p>Teachers may make reasonable allowances for the learners, based on the evidence provided, in accordance with the Assessment Policy This may relate to the timeframe for submitting/attempting the assessment task or to an alternative form of assessment evidence to be used for assessing the learner's level of achievement.</p>

Teacher Contact Details		

Student Assessment Guide (Unit of Competency)

(Streamlined Training Package)

Faculty	College
Teaching Section	Electrical Engineering
Qualification Number and Name	Advanced Diploma of Engineering – Electrical Advanced Diploma of Engineering Technology - Electrical
Unit of Competency Number and Name	UEEEL0062 A Provide engineering solutions to problems in complex polyphase power circuits
Application	<p>This unit covers determining correct operation of complex polyphase power circuits and providing solutions as they apply to electrical power engineering work functions. It encompasses working safely, problem solving procedures, including using electrical measuring devices, applying appropriate circuit theorems and providing solutions derived from measurements and calculations and justification for such solutions.</p> <p><u>Note:</u> This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.</p>
Prerequisites	<p>Essential Competencies:</p> <p>Granting competency in this unit shall be made only after competency in the following unit(s) or their superseded units in UEE20 Training Package as per mapping table http://www.highlightcomputer.com/UEE11-20Mapping.pdf has/have been confirmed.</p> <p>UEENEEE125A Provide engineering solutions for problems in complex multiple path circuits</p> <p>and</p> <p>UEENEEG102A Solve problems in low voltage a.c. circuits</p>
Licensing,	The skills and knowledge described in this unit require a license to practice in the workplace where plant and equipment operate at voltage above 50 V a.c. or 120 V d.c. However other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships
	<p>REQUIRED SKILLS AND KNOWLEDGE</p> <p>7) This describes the essential skills and knowledge and their level, required for this unit.</p>

**Required
Knowledge &
Skills**

Evidence shall show that knowledge has been acquired of safe working practices and providing solutions for problems in complex polyphase power circuits.
All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

Polyphase power circuit analysis

Evidence shall show an understanding of polyphase power circuit analysis to an extent indicated by the following aspects:

T1 Polyphase supply system encompassing:

advantage of three phase system compared to single phase systems

double subscript notation

phase sequence

120 degree operator

given circuit component parameters, solve practically based problems using:

equivalent circuits of transformers, lines and loads.

component values using rectangular and polar notation.

current divider and potential divider rules using complex impedances.

The “per unit” values of voltage, current, VA and impedance to a common VA base.

T2 Types of three phase system connections encompassing:

supply to balanced star, 3 and 4 wire loads

supply to delta connected loads

effects of phase reversal

representation of currents and voltages as complex phasors for 3 phase and 3 phase and neutral quantities.

calculation the values of and draw labeled phasor diagrams, not to scale, to represent

complex values of current and voltage for balanced and unbalanced loads for star and delta systems.

calculation of values of P, Q and S for balanced and unbalanced systems.

draw and label single phase diagrams to represent 1 phase of a complex 3 phase system.

represent unbalanced voltages or currents as symmetrical components.

Phase to phase currents

Phase to neutral/earth currents.

T3 Balanced three phase loads encompassing:

calculations of balanced loads connected in star

calculations of balanced loads connected in delta

calculation of steady state values of fault current for various configurations.

evaluation of the symmetrical component impedances for the various distribution system components. Transformers (earthed neutral case). Generators (high impedance earth)

calculation of fault currents using the per unit approach.

calculation using the “worst case” values based on transformer impedance only (ie., a short circuit fault)

estimation of peak values using accepted multipliers.

effects of the d.c. component on the instantaneous magnitudes of fault currents in transformers and generators.

T4 Unbalanced three phase loads encompassing:

Star – 4 wire systems

Delta systems

Star – 3 wire systems

Star 4 wire with neutral impedance

T5 Power in three-phase circuits encompassing:

summation of phase powers and power in balanced loads

measurement of power in balanced loads – 2 Wattmeter methods

**Required
Knowledge &
Skills**

	<p>T6 Reactive three phase power encompassing: power triangle calculation measurement of VAR power factor correction</p> <p>T7 Fault currents encompassing: symmetrical components positive, negative and zero sequence impedance fault current breaking and let-through energy capacities of circuit breakers, fuses importance of fault/arc impedance calculation of fault currents - phase-to-earth faults calculation of fault currents - phase-to-phase faults analysis of asymmetrical faults currents.</p> <p>T8 Harmonics in three phase systems encompassing: presence of triple in harmonics in 3 phase systems effects of 3 phase harmonics for different star and delta connections. methods for reducing harmonics in three phase systems.</p>																		
<p>Assessment criteria</p>	<p>You will be assessed against the following criteria to establish your competence in the unit:</p> <p>Event 1 (Theory test 1) You will be assessed based on the theory test which mainly consist of problem solving however there may be some multiple choice questions. Theory test will cover solving DC circuits using all the circuit analysis techniques and network theorems. It will also contain test of mathematical ability required. Test will be of 50% marks.</p> <p>Event 2 (Theory test 2) You will be assessed based on the theory test 2 which mainly consist of problem solving and covers all the methods of analysis, network theorems studied under DC circuits but in this the circuits will be AC. Test will be worth 50%</p>																		
<p>Assessment methods & schedule</p>	<table border="1"> <thead> <tr> <th>Assessment event no.</th> <th>Assessment Name/ Method</th> <th>Assessment date</th> <th>Assessment duration</th> <th>Assessment venue</th> <th>Assessment outcome</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Theory Test 1</td> <td></td> <td></td> <td></td> <td>Satisfactory/Not yet satisfactory</td> </tr> <tr> <td>2</td> <td>Theory Test 2</td> <td></td> <td></td> <td></td> <td>Satisfactory/Not yet satisfactory</td> </tr> </tbody> </table>	Assessment event no.	Assessment Name/ Method	Assessment date	Assessment duration	Assessment venue	Assessment outcome	1	Theory Test 1				Satisfactory/Not yet satisfactory	2	Theory Test 2				Satisfactory/Not yet satisfactory
Assessment event no.	Assessment Name/ Method	Assessment date	Assessment duration	Assessment venue	Assessment outcome														
1	Theory Test 1				Satisfactory/Not yet satisfactory														
2	Theory Test 2				Satisfactory/Not yet satisfactory														
<p>Reporting assessment outcomes</p>	<p>Your Transcript of Academic Record lists all of your results in your study to date.</p> <p>"This is an ungraded unit; therefore your academic result will be recorded and reported to you as Competent (AC) or Not Yet Competent (NC)".</p> <p>If you achieved competency in this unit but are unable to finish the qualification, you will receive a Transcript of Academic Record showing only the units you completed. A Statement of Attainment for the unit/units you have successfully completed will also be provided. Please contact the Head Teacher to initiate this process.</p> <p>Recognition and credit transfers: you can apply to have your previous study, work and/or life experiences recognised. Recognition of Prior Learning will be determined according to Recognition Policy.</p> <p>Please see Recognition for previous learning and experience - for further information.</p>																		

Resources required for assessments	<p>Learner Resource Manual Students don't need to purchase any Learner Resource Manual :</p> <p>Principal References</p> <ol style="list-style-type: none"> 1) Handouts given by the teacher 2) Class notes 3) Fundamentals of Electrical circuits by D A Bell (In library)
Assessment feedback, review or appeals	<p>Your teacher will provide feedback no later than three (3) weeks after all assessment activities have been conducted.</p> <p>If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.</p> <p>You will have three weeks from the date you receive your results in which to make an appeal and request a review.</p> <p>You will receive a response within ten working days after receipt of the request.</p>
Assessment guidelines	<p>You must submit assessment work and attended scheduled assessments on the required dates.</p> <ul style="list-style-type: none"> • If you miss an assessment you must discuss the issue of the missed assessment with your teacher within <u>seven days</u>, or at your first class attendance after the assessment, whichever occurs first. • If you miss an exam, or arrive late by more than 30 minutes after the commencement of the exam, due to illness or circumstances beyond your control, you should contact the teacher of this unit. • If you are deemed unsatisfactory in an assessment event you will be eligible to receive one (1) additional reattempt to demonstrate competence. Speak to your teacher for further information. • If you engage in cheating such as copying, colluding with another person, using unauthorised notes, or allowing another person to copy your work, you will be liable for disciplinary action as per Student Discipline Policy - Whatever the form of assessment, it is essential that the work you are assessed on is your own. To validate the authenticity of your submitted work it may be checked used anti plagiarism software in addition it may be stored for future plagiarism checking. <p>We provide learners with every reasonable opportunity to have their work assessed and where possible each case of learner absence from an assessment will be considered on an individual basis. However, where there are no extenuating circumstances, the following penalties apply:</p> <ul style="list-style-type: none"> • where the results of the unit are recorded in marks, when the assessment is up to seven days late the result achieved by the learner is reduced by 15% • when the assessment is more than seven days late, the result recorded is recorded as "not yet competent" • for non-attendance at an assessment on a negotiated date, the result is recorded as "not yet competent".
Assessment: reasonable adjustments	<p>If you are a student with a disability it is important for you to indicate this on your enrolment form and make contact with the Teacher / Consultant for Students with a Disability in your Institute for further information. If possible, this should happen before you enrol. They will provide you with appropriate information about the range of units available. Teachers and teacher consultants will arrange for students with a disability to be given reasonable adjustment in assessment on an individual needs basis.</p>

Teachers may make reasonable allowances for the learners, based on the evidence provided, in accordance with the [Assessment Policy](#) This may relate to the timeframe for submitting/attempting the assessment task or to an alternative form of assessment evidence to be used for assessing the learner's level of achievement.

Teacher Contact Details		

STUDENT ASSESSMENT GUIDE – UNIT OF COMPETENCY

Qualification	UEE62122 ADVANCED DIPLOMA OF ENGINEERING TECHNOLOGY-ELECTRICAL
Unit of competency	UEEEL0079 Plan and analyse LV electrical apparatus
Unit Descriptor	This unit covers ascertaining correct operation of single and three phase low voltage electrical apparatus and circuits and solving circuit problems as they apply to servicing, fault finding, installation and compliance work functions. It encompasses safe working practices, apparatus circuit arrangements, issues related to operation, characteristics and protection and solutions to apparatus/circuit problems derived from calculated and measured parameters.
Prerequisites	
Assessment criteria	<p>Before the critical aspects of evidence are considered all prerequisites shall be met. Evidence for competence in this unit shall be considered holistically. Each element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines -ETC'. Evidence shall also comprise:</p> <ul style="list-style-type: none"> • A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to: <ul style="list-style-type: none"> • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement • Apply sustainable energy principles and practices as specified in the performance criteria and range statement • Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements. • Demonstrate an appropriate level of skills enabling employment • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures • Demonstrated consistent performance across a representative range of contexts from the prescribed items below: <ul style="list-style-type: none"> • Solve problems in single and three phase low voltage electrical apparatus and circuits as described as described in 8) and including: <ol style="list-style-type: none"> a. Determining the operating parameters of existing apparatus/circuits. b. Altering an existing apparatus/circuit to comply with specified operating parameters. c. Developing apparatus/circuits to comply with a specified function and operating parameters. d. Determining the cause of low efficiency in an existing apparatus/circuit. e. Determining conditions causing an existing apparatus/circuit to be unsafe. f. Dealing with unplanned events
Assessment methods	<p>You will be required to complete all assessments for this unit to demonstrate your competence in this unit.</p> <p>You will be assessed by the following methods:</p> <p><i>*Please note this information MUST be identical to the agreed assessment methods as listed on the TAS – <u>methods of gathering evidence</u> for this particular Unit of competency.</i></p> <p><i>*Methods mentioned below are <u>samples</u> only to demonstrate how to complete the form and need to be mapped against the critical aspects of assessment by individual teaching sections.</i></p>

	Assessment no.	Assessment method	Assessment grading
	1	Assignment (50 %)	Satisfactory/Not Yet Satisfactory
	2	Written exam (30%)	Satisfactory/Not Yet Satisfactory
	3	Observation (20%)	Satisfactory/Not Yet Satisfactory
Assessment schedule	You will be assessed for this unit as per the following schedule: <ul style="list-style-type: none"> Assessment 1 is given to students' in week 10 and due on week 18. Assessment 2 is conducted in week 15 Assessment 3 is conducted in week 18 		
	Assessment no.	Assessment date	Assessment venue
	1	Week 18	
	2	Week 15	
	3	Week 18	
Reporting assessment outcomes	<p>Your Transcript of Academic Record lists all of your results in your study to date.</p> <p>This is an ungraded unit; therefore your result will be recorded and reported to you as Competent (AC) or Not Yet Competent (NC).</p> <p>If you have achieved competency in this unit but are unable to finish the qualification, you will receive a Transcript of Academic Record showing only the units you have completed. You will also receive a Statement of Attainment for the unit/units you have successfully completed.</p> <p>.</p>		
Resources required for assessments	<p>This unit is assessed using specific resources/tools:</p> <p>You will be provided</p> <ul style="list-style-type: none"> access to a simulated environment access to workplace documents, information and resources (such as compliance obligations, enterprise plans, work responsibilities) <p>You are required to bring in the following for the assessments:</p> <p>N/A</p>		
Assessment feedback, review or appeals	<p>Your teacher will provide feedback no later than three (3) weeks after all assessment activities have been conducted.</p> <p>If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher. You will have three weeks from the date you receive your results in which to make an appeal and request a review.</p> <p>You will receive a response within ten working days after receipt of the request.</p>		
Assessment conditions	<p>You must submit assessment work and attended scheduled assessments on the required dates.</p> <ul style="list-style-type: none"> If you miss an assessment you must discuss the issue of the missed assessment with your teacher within <u>seven days</u>, or at your first class attendance after the assessment, whichever occurs first. If you miss an exam, or arrive late by more than 30 minutes after the commencement 		

	<p>of the exam, due to illness or circumstances beyond your control, you should contact the teacher of this unit.</p>
Assessment: reasonable adjustments	<p>If you are a student with a disability it is important for you to indicate this on your enrolment form and make contact with the Teacher / Consultant for Students with a Disability in your Institute for further information. If possible, this should happen before you enrol. They will provide you with appropriate information about the range of units available. Teachers and teacher consultants will arrange for students with a disability to be given reasonable adjustment in assessment on an individual needs basis.</p>
Contact Details	<p>Unit Teacher</p> <p>U Kyaw Naing (Joe)</p>

Student Assessment Guide (Unit of Competency)

(Streamlined Training Package)

Faculty	College
Teaching Section	Electrical Engineering
Qualification Number and Name	Advanced Diploma of Engineering - Electrical
Unit of Competency Number and Name	UEECD0036 - Providing engineering solutions for problems in complex multiple path circuits.
Application	<p>This unit covers determining correct operation of complex multiple path circuits and providing engineering solutions as they apply to various branches of electrotechnology work functions. It encompasses working safely, problem solving procedures, including using electrical measuring devices, applying appropriate circuit theorems and providing solutions derived from measurements and calculations and justification for such solutions.</p> <p><u>Note:</u> This unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.</p>
Prerequisites	<p>Essential Competencies: Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.</p> <p>UEECD0039 Provide solutions to basic engineering computational problems</p> <p>Literacy and Numeracy Skills: Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 "Literacy and Numeracy"</p>
Licensing,	The skills and knowledge described in this unit require a license to practice in the workplace where plant and equipment operate at voltage above 50 V a.c. or 120 V d.c. However other conditions may apply in some jurisdictions subject to regulations related to electrical work. Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships
Required Knowledge & Skills	You will be assessed to prove your competence in the required skills and knowledge below:

**Required
Knowledge &
Skills**

Evidence shall show that knowledge has been acquired of safe working practices and provide engineering solutions for solving problems in complex multiple path circuits. All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

Circuit analysis

Evidence shall show an understanding of circuit analysis to an extent indicated by the following aspects:

T1 Voltage/Current Sources and Kirchhoff's Law for d.c. Linear Circuits encompassing:

- calculating the effect of the internal resistance on terminal voltage and current delivered for practical voltage sources and current sources
- calculating current and voltage in any d.c. network of up to two loops and three sources.
- Kirchhoff's Law using a circuit simulation program.
- function and operation of an electronics circuit simulation program.
- using electronics circuit simulation program.

T2 Superposition Principles for d.c. Linear Circuits encompassing:

- d.c. networks (two loops, three sources)
- using simulation programs
- calculating current and voltage in any d.c. network of up to two loops and three sources.
- Superposition theorem using a circuit simulation program.

T3 Mesh and Nodal Analysis for d.c. Linear Circuits encompassing:

- writing mesh equations for d.c. networks containing up to three loops.
- writing Nodal equations for d.c. networks containing up to three nodes.
- using mesh analysis to find currents in d.c. networks of up to two loops.
- using nodal analysis to find node voltage and branch currents in d.c. networks of up to two nodes
- using a circuit simulation program to confirm the results of Mesh analysis or Nodal analysis of d.c. networks.

T4 Thévenin's principles for d.c. Linear Circuits encompassing:

- calculating the effect of the internal resistance on terminal voltage and current delivered for practical voltage sources and current sources.
- calculating the Thévenin equivalent voltage and resistance for d.c. networks and determining the load current, voltage and power.
- converting the Thévenin equivalent circuit to a Norton equivalent circuit and vice versa.
- verifying the equivalence of Thévenin equivalent circuits by measurement.

T5 Norton's principles for d.c. linear circuits encompassing:

- calculating the effect of the internal resistance on terminal voltage and current delivered for practical voltage sources and current sources.
- calculating the Norton equivalent current and resistance for d.c. networks and determining the load current, voltage and power.
- converting the Thévenin equivalent circuit to a Norton equivalent circuit and vice versa.
- verifying the equivalence of Norton equivalent circuits by measurement.

T6 Phasors encompassing:

- time domain and frequency domain
- frequency, angular frequency and units of measurement

- defining rms and convert between time domain and rms phasor values for a sine wave.
- converting between angular frequency and frequency.
- using a calculator to convert between polar and rectangular forms of phasor.
- representing a.c. voltages on a phasor diagram.

T7 Complex Impedance encompassing:

- defining impedance, resistance and reactance.
- defining admittance, conductance and susceptance.
- converting between conductance to resistance.
- converting between susceptance and reactance.
- converting between impedance and admittance.
- sketching impedance and admittance diagrams.
- calculating two-component series equivalent circuits and two-component parallel equivalent circuits and convert between these forms.

T8 Series and parallel a.c. linear circuits encompassing:

- Kirchhoff's Laws
- series equivalent impedance
- parallel equivalent impedance
- voltage divider and current divider rules
- calculating and measuring voltage and currents in a series a.c. circuit and draw the phasor diagram.
- calculating and measuring currents in a parallel a.c. circuit and draw the phasor diagram.
- calculating and measuring voltage and currents in a series/parallel a.c. circuit and draw the phasor diagram.

T9 Superposition principles and Kirchoff's Laws applied to a.c. linear circuits encompassing:

- calculating current and voltage in any a.c. network of up to two loops and two sources.
- using circuit simulation programs to demonstrate the superposition theorem.
- function and operation of an electronics circuit simulation program.
- entering given circuit specifications into an electronic circuit program.
- setting the circuit simulation program operation parameters including input and output values, ranges and graduation.
- producing hardcopies of the circuit and analyse results.

T10 Mesh and Nodal analysis for a.c. linear circuits encompassing:

- Mesh analysis
- Node voltages and nodal analysis
- matrix representation
- method of determinants
- writing mesh equations for a.c. networks containing up to three loops.
- writing nodal equations for a.c. networks containing up to three nodes.
- using mesh analysis to find currents in a.c. networks of up to two loops.
- using nodal analysis to find node voltage and branch currents in a.c. networks of up to two nodes.
- using a circuit simulation program to confirm the results of mesh analysis or nodal analysis of a.c. networks.

T11 Thévenin and Norton theorems applied to a.c. linear circuits encompassing:

- calculating the effect of the internal resistance on terminal voltage and current delivered for practical voltage sources and current sources.

- calculating the Thévenin equivalent voltage and impedance for a.c. networks and determining the load current, voltage and power.
- calculating the Norton equivalent current and impedance for a.c. networks and determining the load current, voltage and power.
- converting the Thévenin equivalent circuit to a Norton equivalent circuit and vice versa.
- verifying the equivalence of Thévenin and Norton equivalent circuits by measurement.

T12 Star-delta conversions encompassing:

- Star connections
- Star-delta transformation formula equations
- selection of appropriate conversion
- calculating the delta connected equivalent of a star connected balanced a.c. or d.c. load and vice versa.
- converting a complex non-series/parallel network to a series/parallel network by means of star-delta or delta-star conversions.
- verifying star-delta and delta-star network conversions by measurements.

T13 Complex a.c. power and maximum power transfer theorem encompassing:

- true power, reactive power and apparent power
- maximum power transfer
- calculating real, reactive and apparent power for series/parallel a.c. circuits and state the appropriate units of measurement.
- calculating the power factor of a.c. series/parallel circuits.
- drawing power triangle for a given circuit.
- calculating the load value which would consume maximum power and calculate this power for d.c. networks.
- calculating the load value which would consume maximum power in an a.c. network when the load is a pure resistance and calculate the power.
- calculating the load value which would consume maximum power in an a.c. network when the load is an impedance of variable resistance and reactance and calculate the power.
- verifying load selection by measurement.

T14 Transients encompassing:

- transients in R-C and R-L circuits
- growth and decay
- calculating voltage and currents in R-C series circuits using exponential equations.
- calculating voltage and currents in R-L series circuits using exponential equations

Assessment criteria

You will be assessed against the following criteria to establish your competence in the unit:

Event 1 (Theory test 1) You will be assessed based on the theory test which mainly consist of problem solving however there may be some multiple choice questions. Theory test will cover solving DC circuits (T1 to T5) using all the circuit analysis techniques and network theorems. It will also contain test of mathematical ability required. Test will be of 50% marks.

Event 2 (Theory test 2) You will be assessed based on the theory test 2 which mainly consist of problem solving and covers all the methods of analysis, network theorems studied under DC circuits but in this the circuits will be AC (T6 to T14).

Assessment methods & schedule	Assessment event no.	Assessment Name/ Method	Assessment date	Assessment duration	Assessment venue	Assessment outcome
	1	Theory Test 1				Satisfactory/Not yet satisfactory
	2	Theory Exam 2				Satisfactory/Not yet satisfactory
Reporting assessment outcomes	<p>Your Transcript of Academic Record lists all of your results in your study to date.</p> <p>"This is an ungraded unit; therefore your academic result will be recorded and reported to you as Competent (AC) or Not Yet Competent (NC)".</p> <p>If you achieved competency in this unit but are unable to finish the qualification, you will receive a Transcript of Academic Record showing only the units you completed. A Statement of Attainment for the unit/units you have successfully completed will also be provided. Please contact the Head Teacher to initiate this process.</p> <p>Recognition and credit transfers: you can apply to have your previous study, work and/or life experiences recognised. Recognition of Prior Learning will be determined according to Recognition Policy.</p> <p>Please see Recognition for previous learning and experience for further information.</p>					
Resources required for assessments	<p>Learner Resource Manual Students don't need to purchase any Learner Resource Manual :</p> <p>Principal References</p> <ol style="list-style-type: none"> 1) Handouts given by the teacher 2) Class notes 3) Fundamentals of Electrical circuits by D A Bell (In library) 					
Assessment feedback, review or appeals	<p>Your teacher will provide feedback no later than three (3) weeks after all assessment activities have been conducted.</p> <p>If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.</p> <p>You will have three weeks from the date you receive your results in which to make an appeal and request a review.</p> <p>You will receive a response within ten working days after receipt of the request.</p>					
Assessment guidelines	<p>You must submit assessment work and attended scheduled assessments on the required dates.</p> <ul style="list-style-type: none"> • If you miss an assessment you must discuss the issue of the missed assessment with your teacher within <u>seven days</u>, or at your first class attendance after the assessment, whichever occurs first. • If you miss an exam, or arrive late by more than 30 minutes after the commencement of the exam, due to illness or circumstances beyond your control, you should contact the teacher of this unit. • If you are deemed unsatisfactory in an assessment event you will be eligible to receive one (1) additional reattempt to demonstrate competence. Speak to your teacher for further information. 					

	<ul style="list-style-type: none"> • If you engage in cheating such as copying, colluding with another person, using unauthorised notes, or allowing another person to copy your work, you will be liable for disciplinary action as per Student Discipline Policy. Whatever the form of assessment, it is essential that the work you are assessed on is your own. To validate the authenticity of your submitted work it may be checked using anti plagiarism software in addition it may be stored for future plagiarism checking. <p>We provide learners with every reasonable opportunity to have their work assessed and where possible each case of learner absence from an assessment will be considered on an individual basis. However, where there are no extenuating circumstances, the following penalties apply:</p> <ul style="list-style-type: none"> • where the results of the unit are recorded in marks, when the assessment is up to seven days late the result achieved by the learner is reduced by 15% • when the assessment is more than seven days late, the result recorded is recorded as "not yet competent" • for non-attendance at an assessment on a negotiated date, the result is recorded as "not yet competent".
<p>Assessment: reasonable adjustments</p>	<p>If you are a student with a disability it is important for you to indicate this on your enrolment form and make contact with the Teacher / Consultant for Students with a Disability in your Institute for further information. If possible, this should happen before you enrol. They will provide you with appropriate information about the range of units available. Teachers and teacher consultants will arrange for students with a disability to be given reasonable adjustment in assessment on an individual needs basis.</p> <p>Teachers may make reasonable allowances for the learners, based on the evidence provided, in accordance with the Assessment Policy - This may relate to the timeframe for submitting/attempting the assessment task or to an alternative form of assessment evidence to be used for assessing the learner's level of achievement.</p>

<p>Teacher Contact Details</p>		

STUDENT ASSESSMENT GUIDE – UNIT OF COMPETENCY

Qualification	Engineering Technology – Electrical		
Unit of competency	UEEIC0013 Develop, enter and verify discrete control programs for programmable controllers MEM30027A Prepare basic programs for programmable logic controllers		
Unit Descriptor	This unit covers development, installation and testing of programs for programmable controllers (PLC) for a system requiring discrete control functions. It encompasses working safely, applying knowledge of control systems, control system development methods, using ladder diagrams/statement list/function block diagram instruction sets, following written instructions and documenting program development and testing activities.		
Prerequisites	UEENEEE101A /UEECD0007Apply Occupational Health Safety regulations, codes and practices in the workplace		
Assessment criteria	<p>Programmable controllers</p> <p>Key Areas of Assessment</p> Software – enter/test /transfer/simulate Hardware-wiring/safety/Emergency Stops/failsafe Basic Programming- Examine on/off Basic Programming Stop/Start Develop a program from a description Use Flags / Internals , create Assignment List/symbolic table Basic Programming – Use Timers Basic Programming – Use Counter and Comparators Use Jumps / Blocks / Structured Programming OH&S – Safety / PLC Safety		
Assessment methods	You will be required to complete all assessments for this unit to demonstrate your competence in this unit:		
	Assessment no.	Assessment method	Assessment grading
	1	Workplace Simulations (1-4)	[Satisfactory/Not Yet Satisfactory]
	2	Practical Test	[Satisfactory/Not Yet Satisfactory]
3	Theory Test	[Satisfactory/Not Yet Satisfactory]	
Assessment schedule	You will be assessed for this unit as per the following schedule:		
	Assessment no.	Assessment date	Assessment venue
	1		PLC Lab
	2		PLC Lab
	3		PLC Lab

<p>Reporting assessment outcomes</p>	<p>Your Transcript of Academic Record lists all of your results in your study to date.</p> <p>“This is an ungraded unit; therefore your result will be recorded and reported to you as Competent (AC) or Not Yet Competent (NC)”.</p> <p>If you have achieved competency in this unit but are unable to finish the qualification, you will receive a Transcript of Academic Record showing only the units you have completed. You will also receive a Statement of Attainment for the unit/units you have successfully completed.</p> <p>Recognition and credit transfers:you can apply to have your previous study, work and/or life experiences recognised. Recognition of Prior Learning will be determined according to TAFE NSW Recognition Policy.</p>
<p>Resources required for assessments</p>	<p>This unit is assessed using specific resources/tools:</p> <p>You will be provided</p> <ul style="list-style-type: none"> • access to a simulated environment • access to workplace documents, information and resources (such as compliance obligations, enterprise plans, work responsibilities) <p>You are required to bring in the following for the assessments:</p> <p>N/A</p>
<p>Assessment feedback, review or appeals</p>	<p>Your teacher will provide feedback no later than three (3) weeks after all assessment activities have been conducted.</p> <p>If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.</p> <p>You will have three weeks from the date you receive your results in which to make an appeal and request a review.</p> <p>You will receive a response within ten working days after receipt of the request.</p>
<p>Assessment conditions</p>	<p>You must submit assessment work and attended scheduled assessments on the required dates.</p> <ul style="list-style-type: none"> ○ If you miss an assessment you must discuss the issue of the missed assessment with your teacher within <u>seven days</u>, or at your first class attendance after the assessment, whichever occurs first. ○ If you miss an exam, or arrive late by more than 30 minutes after the commencement of the exam, due to illness or circumstances beyond your control, you should contact the teacher of this unit. ○ For final examinations in Category A or B (exams that are centrally set and timetabled) you have 10 working days. Your teacher will inform you about the revised examination date which may not be until the following year. ○ If you engage in cheating such as copying, colluding with another person, using unauthorised notes, or allowing another person to copy your work, you will be liable for disciplinary action as

	<p>per Student Discipline Policy .Whatever the form of assessment, it is essential that the work you are assessed on is your own.</p> <p>We provide learners with every reasonable opportunity to have their work assessed and where possible each case of learner absence from an assessment will be considered on an individual basis. However, where there are no extenuating circumstances, the following penalties apply:</p> <ul style="list-style-type: none"> ○ where the results of the unit are recorded in marks, when the assessment is up to seven days late the result achieved by the learner is reduced by 15% ○ when the assessment is more than seven days late, the result recorded is recorded as “not yet competent” ○ for non-attendance at an assessment on a negotiated date, the result is recorded as “not yet competent”. <p>.</p>
<p>Assessment: reasonable adjustments</p>	<p>If you are a student with a disability it is important for you to indicate this on your enrolment form and make contact with the Teacher / Consultant for Students with a Disability in your Institute for further information. If possible, this should happen before you enrol. They will provide you with appropriate information about the range of units available. Teachers and teacher consultants will arrange for students with a disability to be given reasonable adjustment in assessment on an individual needs basis.</p> <p>Teachers may make reasonable allowances for the learners, based on the evidence provided, in accordance with the Assessment Policy and guidelines. This may relate to the timeframe for submitting/attempting the assessment task or to an alternative form of assessment evidence to be used for assessing the learner’s level of achievement.</p>

<p>Contact Details</p>		

Student Assessment Guide (Unit of Competency)

(Streamlined Training Package)

Faculty	C.E.T.	College	
Teaching Section	Electrical Engineering		
Qualification Number and Name	Advanced Diploma of Engineering Technology - Electrical Advanced Diploma of Electrical Engineering Advanced Diploma of Engineering Technology - Electronics		
Unit of Competency Number and Name	UEERE0013 Sustainability in the Energy Sector		
Application	This unit covers developing strategies to address environmental and sustainability issues in the energy sector. It encompasses working safely, apply extensive knowledge of sustainable energy systems and components and their operating parameters, gathering and analysing data, applying problem solving techniques, developing and documenting alternatives solutions.		
Prerequisites	None Literary and Numeracy: Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 "Literacy and Numeracy"		
Licensing, Legislative or Certification requirements	None		
Required Skills & Knowledge	<p>All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.</p> <p>You will be assessed to prove your competence in the required skills and knowledge below:</p> <p style="text-align: center;">Sustainability in the Energy Sector</p> <p>Evidence shall show an understanding of greenhouse reduction strategies to an extent indicated by the following aspects:</p> <p>T1 Principles of sustainability encompassing:</p> <ul style="list-style-type: none"> • ways in which ecosystems moderate climate. • ways in which ecosystems purify and store water. • ways in which ecosystems recycle waste. <p>T2 Problems in a sustainable world encompassing:</p> <ul style="list-style-type: none"> • changes to Australian forest cover since white settlement, and the resulting loss of ecosystem and human benefits. • changes to Australia's soils since white settlement, and the resulting loss of ecosystem and human benefits. • changes to Australia's waterways since white settlement, and the resulting loss of ecosystem and human benefits. • place of environmental accounting in quantifying Australia's environmental losses. • limits to Australia's population carrying capacity. <p>T3 Sustainability principles encompassing:</p> <ul style="list-style-type: none"> • principles within sustainability including: environmental accounting and economies; full cost pricing; triple bottom line ethic; ecologically sustainable development; greenhouse 		

<p>Required Skills & Knowledge</p>	<p>gas abatement; energy efficiency; resource and water use efficiency; life cycle costing; renewable energy substitution, cleaner production; waste minimisation, reuse and recycling ecological footprint.</p> <p>T4 Addressing the problem of global warming encompassing:</p> <ul style="list-style-type: none"> • greenhouse gases and their sources and quantities that contribute to global warming • global warming impacts for Australia for 2030 and 2070 predicted by CSIRO modelling. • requirements to achieve stable atmospheric concentrations of greenhouse gases. • ecologically and economically sustainable methods for achieving these stable concentrations. <p>T5 Greenhouse gas emissions profile encompassing:</p> <ul style="list-style-type: none"> • goals and principles of the National Greenhouse Strategy • what a greenhouse gas inventory is, why it is required, and the sectors to which it applies • uses to which the National Greenhouse Gas Inventory can be applied. <p>T6 Understanding and communicating climate change and its impacts encompassing:</p> <ul style="list-style-type: none"> • the possible impact of climate change in Australia. • techniques for improving the understanding of climate change • techniques for communicating to and educating the general public on greenhouse gas induced climate change. <p>T7 Partnerships for greenhouse action encompassing:</p> <ul style="list-style-type: none"> • actions achievable by each level of government to implement the NGS. • methods by which the community activity can be engaged in the reduction of greenhouse gas emissions. • initiatives that can be undertaken by the private sector to reduce greenhouse gas emissions. • advantages of international partnerships. • emissions trading system. <p>T8 Efficient and sustainable energy use and supply encompassing:</p> <ul style="list-style-type: none"> • techniques for reducing the greenhouse intensity of energy supply. • types of renewable energy sources suitable for use in Australia. • methods and technique for improving end-use efficiency. <p>T9 Efficient transport and sustainable urban planning encompassing:</p> <ul style="list-style-type: none"> • how integrating land use and transport planning can assist the greenhouse problem. • how each of the following can be used to mitigate greenhouse gas; travel demand and traffic management strategies; encouraging greater use of public transport, walking and cycling; freight and logistics systems; improving vehicle fuel efficiency and fuel technologies <p>T10 Greenhouse sinks and sustainable land management encompassing:</p> <ul style="list-style-type: none"> • how enhancing greenhouse sinks and encouraging sustainable forestry and vegetation management can complement the AGS. • how greenhouse gas emissions are obtained from agricultural production and describe techniques to mitigate the emissions. <p>T11 Models of greenhouse best practice in industrial processes and waste management encompassing:</p> <ul style="list-style-type: none"> • types and methods of reducing greenhouse gas emissions from industry. • methods of reducing methane emissions from waste treatment and disposal. <p>T12 Adaptation to climate change encompassing:</p> <ul style="list-style-type: none"> • salient points in each of the key sectors that require analysis and the strategies required in the need for adaptation to climate change
<p>Assessment criteria</p>	<p>Sufficient evidence must be collected, using local assessment methods/tools identified in the Assessment Table below to demonstrate both the student's:</p> <ol style="list-style-type: none"> 1. Successful Performance of the Competency, by meeting the requirements in the Work Performance Specification, and an 2. Understanding of the required skills and knowledge (KS01-EE082A), by meeting the requirements in the Learning Specification/s. <p>You will be assessed against the following criteria to establish your competence in the unit:</p> <p>Event 1: Assignment 1. A full report based on topics T1 to T7, T10 to T12..</p>

	Event 2: Assignment 2. A full report based on topics T8 and T9.					
Assessment methods & schedule	Assessment event no.	Assessment Name/ Method	Assessment date	Assessment duration	Assessment venue	Assessment outcome
	1	Assignment 1				S/NS
	2	Assignment 2				S/NS
Reporting assessment outcomes	<p>Your Transcript of Academic Record lists all of your results in your study to date.</p> <p>“This is an ungraded unit; therefore your academic result will be recorded and reported to you as Competent (AC) or Not Yet Competent (NC)”.</p> <p>If you achieved competency in this unit but are unable to finish the qualification, you will receive a Transcript of Academic Record showing only the units you completed.</p> <p>A Statement of Attainment for the unit/units you have successfully completed will also be provided. Please contact the Head Teacher to initiate this process.</p> <p>Recognition and credit transfers: you can apply to have your previous study, work and/or life experiences recognised.</p> <p>Please see Recognition for previous learning and experience - for further information.</p>					
Resources required for assessments						
Assessment feedback, review or appeals	<p>Your teacher will provide feedback no later than three (3) weeks after all assessment activities have been conducted.</p> <p>If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.</p> <p>You will have three weeks from the date you receive your results in which to make an appeal and request a review.</p> <p>You will receive a response within ten working days after receipt of the request.</p>					
Assessment guidelines	<p>You must submit assessment work and attended scheduled assessments on the required dates.</p> <ul style="list-style-type: none"> • If you miss an assessment you must discuss the issue of the missed assessment with your teacher within <u>seven days</u>, or at your first class attendance after the assessment, whichever occurs first. • If you miss an exam, or arrive late by more than 30 minutes after the commencement of the exam, due to illness or circumstances beyond your control, you should contact the teacher of this unit. • If you are deemed unsatisfactory in an assessment event you will be eligible to receive one (1) additional reattempt to demonstrate competence. Speak to your teacher for further information. • If you engage in cheating such as copying, colluding with another person, using unauthorised notes, or allowing another person to copy your work, you will be liable for disciplinary action as per Student Discipline Policy - Whatever the form of assessment, it is essential that the work you are assessed on is your own. To validate 					

	<p>the authenticity of your submitted work it may be checked used anti plagiarism software in addition it may be stored for future plagiarism checking.</p> <p>We provide learners with every reasonable opportunity to have their work assessed and where possible each case of learner absence from an assessment will be considered on an individual basis. However, where there are no extenuating circumstances, the following penalties apply:</p> <ul style="list-style-type: none"> • where the results of the unit are recorded in marks, when the assessment is up to seven days late the result achieved by the learner is reduced by 15% • when the assessment is more than seven days late, the result recorded is recorded as "not yet competent" • for non-attendance at an assessment on a negotiated date, the result is recorded as "not yet competent".
<p>Assessment: reasonable adjustments</p>	<p>If you are a student with a disability it is important for you to indicate this on your enrolment form and make contact with the Teacher / Consultant for Students with a Disability in your Institute for further information. If possible, this should happen before you enrol. They will provide you with appropriate information about the range of units available. Teachers and teacher consultants will arrange for students with a disability to be given reasonable adjustment in assessment on an individual needs basis.</p> <p>Teachers may make reasonable allowances for the learners, based on the evidence provided, in accordance with the Assessment Policy - This may relate to the timeframe for submitting/attempting the assessment task or to an alternative form of assessment evidence to be used for assessing the learner's level of achievement.</p>

<p>Teacher Contact Details</p>		

Student Assessment Guide (Unit of Competency)

(Streamlined Training Package)

Faculty		College	
Teaching Section	Electrical Engineering		
Qualification Number and Name	<ul style="list-style-type: none"> - Advanced Diploma of Electrical Engineering - Advanced Diploma of Engineering Technology - Electrical - Advanced Diploma of Engineering Technology - Electronics 		
Unit of Competency Number and Name	UEERE0066 Develop effective engineering strategies for energy reduction		
Application	<p>This unit covers evaluating energy used in buildings and developing and documenting strategies/methods to effectively reduce energy use without compromising occupancy standards. It encompasses working safely, setting up and conducting evaluation measurements and evaluating energy use from measured parameters. .</p> <p>..</p>		
Prerequisites			
Licensing,	Neither Legislative licensing nor Certification licensing requirements are needed		
Required Knowledge & Skills	<p>You will be assessed to prove your competence in the required skills and knowledge below:</p> <p>.</p> <p style="text-align: center;">Energy efficient building design</p> <p>Evidence shall show an understanding of energy efficient building design to an extent indicated by the following aspects:</p> <p>T1 Climate and thermal comfort encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> characteristics of the different Australian climatic types. <input type="checkbox"/> use of climatic data in published and electronic forms to extract the quantities relevant to energy efficient design. <input type="checkbox"/> relationship between climate and comfort using bioclimatic or psychrometric charts. <input type="checkbox"/> calculation of heating or cooling degree days or degree hours for various locations. <input type="checkbox"/> calculation of thermal neutrality for a given location. <p>T2 Solar geometry and radiation encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> definition of the terms: declination, hour angle, zenith angle, azimuth and altitude angles, the equation of time. <input type="checkbox"/> conversion of solar time to local time and vice versa. <input type="checkbox"/> position of the sun and the length of shadows with the aid of algorithms, tables, sun charts or computer software. <input type="checkbox"/> daily irradiation incident on a wall, window or roof of a given tilt and orientation. <input type="checkbox"/> relative summer and winter irradiation of windows facing the cardinal orientations. <p>T3 Heat transfer encompassing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> thermal processes of conduction, convection and radiation apply to the transfer of heat in buildings. 		

Required Knowledge & Skills

- calculation of the summer and winter U-values of building elements using tables and software.
- calculation of the infiltration heat transfer in a building.

T4 Glazing Systems encompassing:

- different types of glazing systems and their characteristics.
- different types of shading devices and the window orientations for which they are most appropriate.
- solar heat gain for different glazing types and angles of incidence
- calculation of the average daily irradiation of a window partly shaded by eaves, using computer software.
- calculation of the average daily heat gain through a window partly shaded by eaves.

T5 Insulation encompassing:

- different types of insulation and where they are used.
- how different types of insulation are installed in roofs, walls

and floors.

- determination of the minimum R-values of roof insulation for different locations using Australian Standard AS2627 or similar standards.

T6 Thermal mass encompassing:

- advantages and disadvantages of using substantial thermal mass in different climate types and for different heating and cooling regimes.
- where thermal mass can be located in a building.
- explain what is meant by the following terms: time lag, decrement factor, admittance, response factor.

T7 Comfort control strategies encompassing:

- interpretation of the usefulness of a design strategy with the aid of a psychrometric chart showing control potential zones for a particular location.
- selection of the most useful comfort control strategies for Australian climatic regions.

- determination of the direction of the following: both true and magnetic, north winter and summer sunrise, winter and summer sunset.

solar access in summer and winter to various possible house locations on a site and room locations within the house.

- how vegetation can be used to both funnel and deflect wind.
- using cross ventilation as a cooling strategy.

T9 Thermal performance of a building encompassing:

heating requirements of a building using the heating degree day or hour method.

dynamic performance predicted by a computer simulation program such as NatHERS or BERS.

Integration of active solar systems encompassing:

active solar system types available which can provide hot water, space heating and cooling.

the best location on the roof, and the optimum tilt and orientation of the collector panels.

function of the main components of an air or water-based solar space heating system.

	<ul style="list-style-type: none"> □ schematic of the fluid circuit of an air or water- based space
<p>Assessment criteria</p>	<p>Before the critical aspects of evidence are considered all prerequisites must be met.</p> <p>Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines - UEE07'. Evidence shall also comprise:</p> <ul style="list-style-type: none"> • A representative body of work performance demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to: <ul style="list-style-type: none"> • Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement • Apply sustainable energy principles and practices as specified in the performance criteria and range statement • Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements. • Demonstrate an appropriate level of skills enabling employment • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures. • Demonstrated consistent performance across a representative range of contexts from the prescribed items below: <ul style="list-style-type: none"> • Applying OHS practices in the workplace as described in 8) and including: <ol style="list-style-type: none"> a. Preparing to enter the workplace including, the use of work permits and clearances and isolation permissions.Planning estimation work effectively. b. Understanding and following risk control safe work methods. c. Applying work procedures and instructions as they apply to risk control measures. d. Dealing with accidents and emergencies within the scope of responsibility. e. Participation in consultation processes, identifying hazards and implementing and monitoring control measures. <p>Dealing with unplanned events</p>
<p>Assessment methods & schedule</p>	<p>Assessment of this Learning Specification will be based on the evidence that you provide using 2 or more of the following, as prescribed by your local Institute/ College teaching staff:</p> <ul style="list-style-type: none"> • Observation of skills in practical exercises and • Questioning of knowledge using pen and paper tests, essays, oral tests and/or interviews <p>You will be required to complete all assessments for this unit to demonstrate your competence in this unit.</p> <p>Sufficient evidence must be collected, using local assessment methods/tools identified in the Assessment Table below to demonstrate both the student's:</p> <ol style="list-style-type: none"> 1. Successful Performance of the Competency, by meeting the requirements in the Work Performance Specification, and an 2. Understanding of the required skills and knowledge), by meeting the requirements in the Learning Specification/s.

	Assessment event no.	Assessment Name/ Method	Assessment date	Assessment duration	Assessment venue	Assessment outcome
	1	Practical Test				Satisfactory/Not yet satisfactory
	2	Theory Exam				Satisfactory/Not yet satisfactory
Reporting assessment outcomes	<p>Your Transcript of Academic Record lists all of your results in your study to date.</p> <p>"This is an ungraded unit; therefore your academic result will be recorded and reported to you as Competent (AC) or Not Yet Competent (NC)".</p> <p>If you achieved competency in this unit but are unable to finish the qualification, you will receive a Transcript of Academic Record showing only the units you completed. A Statement of Attainment for the unit/units you have successfully completed will also be provided. Please contact the Head Teacher to initiate this process.</p> <p>Recognition and credit transfers: you can apply to have your previous study, work and/or life experiences recognised. Recognition of Prior Learning will be determined according to Recognition Policy.</p> <p>Please see Recognition for previous learning and experience -for further information.</p>					
Resources required for assessments	<p>This unit is assessed using specific resources/tools:</p> <p>Learner Resource Manual Students don't need to purchase any Learner Resource Manual :</p> <p>Principal References It is advised that students have access to the following reference books as the main references:</p> <ul style="list-style-type: none"> • <i>Sustainable Solar Housing</i> • <i>Solar Thermal Installation</i> • <i>Renewable Energy-Power for sustainable Future</i> • <i>Solar Engineering of Thermal Process</i> • <i>Renewable Energy-Energy Efficient Building Design Resource Book- TAFE-QLD</i> • <i>Materials for Engineers & Technician</i> • <i>AS4777/AS3000/AS3008</i> • <i>Green Energy Council Publications</i> <p>You will also be provided with</p> <ul style="list-style-type: none"> • Access to a simulated environment containing information similar to that which you may encounter in a workplace. • Access to computer systems for real time assessments sufficient to enable participation in the assessment process. <p>Other Resources To complete this unit successfully you should bring the following equipment to class with you:</p> <ul style="list-style-type: none"> • pens, pencils, notepaper, soft rubber eraser • scientific calculator Casio fx-100AU PLUS • USB memory Stick 					
Assessment feedback, review or appeals	<p>Your teacher will provide feedback no later than three (3) weeks after all assessment activities have been conducted.</p> <p>If you would like to request a review of your results or if you have any concerns about your results, contact your teacher or head teacher.</p>					

	<p>You will have three weeks from the date you receive your results in which to make an appeal and request a review.</p> <p>You will receive a response within ten working days after receipt of the request.</p>
<p>Assessment guidelines</p>	<p>You must submit assessment work and attend scheduled assessments on the required dates.</p> <ul style="list-style-type: none"> • If you miss an assessment you must discuss the issue of the missed assessment with your teacher within <u>seven days</u>, or at your first class attendance after the assessment, whichever occurs first. • If you miss an exam, or arrive late by more than 30 minutes after the commencement of the exam, due to illness or circumstances beyond your control, you should contact the teacher of this unit. • If you are deemed unsatisfactory in an assessment event you will be eligible to receive one (1) additional reattempt to demonstrate competence. Speak to your teacher for further information. • If you engage in cheating such as copying, colluding with another person, using unauthorised notes, or allowing another person to copy your work, you will be liable for disciplinary action as per Student Discipline Policy - Whatever the form of assessment, it is essential that the work you are assessed on is your own. To validate the authenticity of your submitted work it may be checked using anti plagiarism software in addition it may be stored for future plagiarism checking. <p>We provide learners with every reasonable opportunity to have their work assessed and where possible each case of learner absence from an assessment will be considered on an individual basis. However, where there are no extenuating circumstances, the following penalties apply:</p> <ul style="list-style-type: none"> • where the results of the unit are recorded in marks, when the assessment is up to seven days late the result achieved by the learner is reduced by 15% • when the assessment is more than seven days late, the result recorded is recorded as "not yet competent" • for non-attendance at an assessment on a negotiated date, the result is recorded as "not yet competent".
<p>Assessment: reasonable adjustments</p>	<p>If you are a student with a disability it is important for you to indicate this on your enrolment form and make contact with the Teacher / Consultant for Students with a Disability in your Institute for further information. If possible, this should happen before you enrol. They will provide you with appropriate information about the range of units available. Teachers and teacher consultants will arrange for students with a disability to be given reasonable adjustment in assessment on an individual needs basis.</p> <p>Teachers may make reasonable allowances for the learners, based on the evidence provided, in accordance with the Assessment Policy - This may relate to the timeframe for submitting/attempting the assessment task or to an alternative form of assessment evidence to be used for assessing the learner's level of achievement.</p>

Teacher Contact Details		

Assessment Mapping - Template

(streamlined training package)

This template to be used for “new” endorsed streamlined training packages.

Instruction for use: These instructions in RED should be deleted from the completed document. Instructions in BLUE should be written over with appropriate information.

- This template is to be completed by the assessment developer to ensure the assessments meet the training package requirements for the unit of competency.
- It must be used during the assessment validation process.
- Record of this document must be retained in the faculty TAS teamshare teaching section.
- Add rows and columns as required below.

Faculty:		College:	
Teaching Section:	Electrical Engineering		
Qualification Number and Name:	UEE62122 Advanced Diploma of Engineering Technology-Electrical/ UEE62220 Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEECD0010 Compile and produce an energy sector detailed report		

This unit is to be concurrently assessed with UEENEEE117A

Copy and paste the following table for each element as required

Elements & Performance Criteria		Assessment event(s)			
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Questions & Answers	Project Assignment/Report
1 Prepare to develop a energy sector report.	1.1	OHS processes and procedures for a given work area are identified, obtained and understood.			Project safety audit report
	1.2	Established techniques for report writing are reviewed are adopted in accordance with organisation policies.		Page 57 to 59 Activities of E124 Report Course book	
	1.3	The scope of the report is evaluated and report parameters established using a formal evaluation/survey processes		Activity 1,2,3 Page 39 to 42 of E124 Report Course book	
	1.4	Criteria from other related works impacting on the report are determined from other sources.		Tasks on page 46 to 49 of E124 Report Course book	
	1.5	Identify source and availability of information		Tasks on page 49 of E124 Report Course book	
2 Develop energy sector report	2.1	Report is developed to include scenarios/requirements established in consultation with appropriate person(s), and regulatory requirements.		Tasks on page 60 to 64 of E124 Report Course book	
	2.2	Report is developed in collaboration with all relevant personnel			Group activity & Role playing activities to produce the project report (Assessed concurrently with G169+G170
	2.3	Competent persons are identified to assist in the compilation of the report			Group activity & Role playing activities to produce the project report (Assessed

Elements & Performance Criteria		Assessment event(s)			
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Questions & Answers	Project Assignment/Report
					concurrently with G169+G170
	2.4	Report is reviewed against all inputs and adjusted to rectify any anomalies			Group activity & Role playing activities to produce the project report (Assessed concurrently with G169+G170)
	2.5	Compile report in accordance with organisation policies and procedures.		Page 57 to 59 Activities of E124 Report Course book	
	2.6	Compile and analyse research report information		Tasks on page 44 to 649 of E124 Report Course book	
3	Obtain approval for final energy sector report.	3.1	Report is presented and discussed with person(s) of higher authority.		Report presentation class activity/ Use of projector & power point
		3.2	Alterations to the report resulting from the presentation/discussion are negotiated with person(s) of higher authority within the constraints of organisation policy.		Group assessment tasks, answering the questions
		3.3	Final report is presented and approval obtained from appropriate person(s).		Finalised report presentation

Performance Evidence	Test	Assignment Questions & Answer	Project Assignment / Report
Collecting information		Assignment tasks	

Performance Evidence	Test	Assignment Questions & Answer	Project Assignment / Report
Analyzing data		Assignment tasks	
Research & evaluation			Project work & Presentation
Use of software, graphs, power point, audio visual aids			Project work & Presentation
Discussion & presentation skills			Project work & Presentation
Group work & communication			Project work & Presentation

Knowledge Evidence	Test	Assignment Report	Project Assignment / Report
T1 Communicating with personnel			Project work & Presentation
T2 Communicating with suppliers		Assignment tasks	
T3 Communicating with customers		Assignment tasks	
T4 Purpose and extent of maintaining work activities records		Page 57 to 59 Activities of E124 Report Course book	
T5 Techniques of analysis		Tasks on page 46 to 49 of E124 Report Course book	
T6 Summary of statistics		Page 6 to 38 Activity 1 to 9 of E124 Report Course book	
T7 Correlation and regression		Page 6 to 38 Activity 1 to 9 of E124 Report Course book	
T8 Investigation and reporting			Project work & Presentation

Add rows to the following table as required

Assessment Conditions	Insert	Insert	Insert
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	Assessment event 1	Assessment event 2	Assessment event 3
. Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the workplace. Noise levels, production flow, interruptions and time variances must be typical of those experienced in the administration – general administration field of work and include access to:			

Created by (Name)		Date created	
Approved by (Name)		Date approved	
Signature		Date modified	

Assessment Mapping - Template

(streamlined training package)

This template to be used for “new” endorsed streamlined training packages.

Instruction for use: These instructions in RED should be deleted from the completed document. Instructions in BLUE should be written over with appropriate information.

- This template is to be completed by the assessment developer to ensure the assessments meet the training package requirements for the unit of competency.
- It must be used during the assessment validation process.
- Record of this document must be retained in the faculty TAS teamshare teaching section.
- Add rows and columns as required below.

Faculty:		College:	
Teaching Section:	Electrical Engineering		
Qualification Number and Name:	UEE62122 Advanced Diploma of Engineering Technology-Electrical/ UEE62220 Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEECD0024 Implement and monitor energy sector OHS policies and procedures		

This unit is to be concurrently assessed with UEECD0026

Copy and paste the following table for each element as required

Elements & Performance Criteria		Assessment event(s)			
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Questions & Answers	Project Assignment/Report
1 Provide OHS information to the work group	1.1	Relevant WHS/OHS legislation and codes of practice are explained to work group		Q 1 to 13 of Advanced Diploma Electrical Engineering Exercises Page 72	
	1.2	Relevant WHS/OHS workplace policies, procedures and programs are available in a readily accessible manner and explained to work group		Q2,4,7,8,9 of Advanced Diploma Electrical Engineering Exercises Page 65	
	1.3	Identified hazards, risk assessments and risk control measures are identified, supplied and explained to the work group	Test 1 Q1+2 Concurrently with E011C/UEECD0026		
2. Implement and monitor participative arrangements for the management of OHS.	2.1	Workplace procedures for consultation of WHS/OHS issues are implemented, monitored and communicated to work group	Test 1 Q7+8 Concurrently with E011C/UEECD0026		
	2.2	Issues raised through consultation are dealt with and resolved promptly or referred to relevant person/s for resolution in accordance with workplace procedures			Risk Assessment Project Report
	2.3	Outcomes of WHS/OHS consultation issues are communicated to the work group			Risk Assessment Project Report
3. Implement and monitor the procedures for identifying hazards, assessing risk and controlling risks.	3.1	Hazards are identified, risks are assessed and control measures are implemented		Q17+18 Page 2 of Advanced Diploma in Electrical Engineering Exercise	

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Questions & Answers	Project Assignment/Report
	3.2	Risks control measures are implemented and adherence by work group is monitored in accordance with workplace procedures		Q19+20 Page 2 of Advanced Diploma in Electrical Engineering Exercise	
	3.3	Inadequacies in existing risk control measures are identified in accordance with hierarchy of risk control and reported to relevant person/s	Test 1 Q 2 to 5 Concurrently with E011C/UEECD0026		
	3.4	Inadequacies in resource allocation for implementation of risk control measures are identified and reported to relevant person/s			Risk Assessment Project Report
4	Implement the procedures for dealing with hazardous events.	4.1	Workplace procedures for responding to hazardous events are implemented to ensure prompt control action is taken		Risk Assessment Project Report
	4.2	Hazardous events are investigated to identify their cause in accordance with workplace procedures		Q17+18 Page 2 of Advanced Diploma in Electrical Engineering Exercise	
	4.3	Control measures to minimise risks of hazardous events based on the hierarchy of risk control are implemented or referred to relevant person/s	Test 1 Q 2 to 5 Concurrently with E011C/UEECD0026		
5.	Implement and monitor the procedures for OHS training.	5.1	WHS/OHS training needs analysis of work group is performed to identify competency gaps	Concurrently assessed with E101/UEECD0007 Test	
	5.2	Identified WHS/OHS training gaps are fulfilled by training programs in consultation with relevant person/s	Concurrently assessed with E101/UEECD0007 Test		

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Questions & Answers	Project Assignment/Report
6.Implement and monitor the procedures for maintaining OHS records	6.1	WHS/OHS records for work area are completed in accordance with workplace procedures and relevant legislative requirements			OHS Assessment Report
	6.2	Aggregate information from work area WHS/OHS records are used to identify hazards and monitor risk control procedures in accordance with workplace procedures			OHS Assessment Report

Performance Evidence	Test	Assignment Questions & Answer	Project Assignment / Report
LV Safety (Concurrently assessed with E011C)		Q 13 to 16 Page 2 of Advanced Diploma in Electrical Engineering Exercise	
Electrical Installation Safety (Concurrently assessed with E011C)		Q 19/20 Page 2 of Advanced Diploma in Electrical Engineering Exercise	
Safety in Substation (Concurrently assessed with E011C)		Q 17/18 Page 2 of Advanced Diploma in Electrical Engineering Exercise	

Knowledge Evidence	Test	Assignment Report	Project Assignment / Report
T1 Provisions of relevant occupational health and safety legislation		Q8 to 12 Page 2 of Advanced Diploma in Electrical Engineering Exercise	

Knowledge Evidence	Test	Assignment Report	Project Assignment / Report
T2 Principles and practice of effective occupational health and safety management		Q8 to 12 Page 2 of Advanced Diploma in Electrical Engineering Exercise	
T3 Workplace hazards, range and selection of control measures			Risk Assessment Project Report
T4 Organisational health and safety management systems and policies and procedures needed for legislative compliance	Test 1 Q 1+2		
T5 Impact of characteristics and composition of the workforce on occupational health and safety management			Risk Assessment Project Report
T6 Relevance of occupational health and safety management to other organisational management policies, procedures and systems.	Concurrently assessed with E101 Test		
T7 Analysis of entire work environment and judge occupational health and safety interventions			Risk Assessment Project Report
T8 Analysis of relevant workplace data			Risk Assessment Project Report
T9 Ability to assess resources needed for risk control			Risk Assessment Project Report

Add rows to the following table as required

Assessment Conditions	Insert Assessment event 1	Insert Assessment event 2	Insert Assessment event 3
. Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the workplace. Noise levels, production flow, interruptions and time variances must be typical of those experienced in the administration – general administration field of work and include access to:			

Created by (Name)		Date created	
Approved by (Name)		Date approved	

Signature

Date modified

Assessment Mapping - Template

(streamlined training package)

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Faculty:		College:	
Teaching Section:	Electrical Engineering		
Qualification Number and Name:	UEE62122 Advanced Diploma of Engineering Technology-Electrical/ UEE62220 Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEECD0026 Manage risk in electrotechnology activities		

This unit is to be concurrently assessed with UEECD0024 Implement and monitor energy sector WHS policies and procedures

+UEECD0010 - Compile and produce an energy sector detailed report

Copy and paste the following table for each element as required

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Questions & Answers	Project Assignment/Report
1 Identify risks and develop management strategies.	1.1	Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures for a given work area are identified, obtained and applied			Project safety audit report
	1.2	Scope of program or project is identified from design brief specifications and/or relevant documentation and in consultation with relevant person/s		Q2,4,7,8,9 of Advanced Diploma Electrical Engineering Exercises Page 65	
	1.3	Potential, perceived and actual risk events are identified, documented and analysed in consultation with risk professionals and/or relevant person/s in accordance with workplace procedures	Test 1 Q1+2		
	1.4	Risk management methods, tools and techniques are used in the analysis, reporting and documenting of identified risk events	Test 1 Q7+8		
	1.5	Risk management techniques are used to analyse risk events, assess options and recommend risk approaches to relevant person/s for approval			Risk Assessment Project Report
	1.6	Risk management processes and workplace procedures are developed for agreement by stakeholders and communicated for ongoing management of risk factors			
	1.7	WHS/OHS risk control measure are incorporated in risk management strategies in accordance with workplace procedures and		Q17+18 Page 2 of Advanced Diploma in Electrical Engineering	

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Questions & Answers	Project Assignment/Report
		relevant industry standards		Exercise	
	1.8	Condition monitoring of plant, equipment, criteria for repair and/or replacement are incorporated in risk management strategies		Q19+20 Page 2 of Advanced Diploma in Electrical Engineering Exercise	
2.Implement and monitor risk management strategies.	2.1	Risk management processes and workplace procedures are incorporated into work and project plans to ensure outcomes are achieved	Test 1 Q 2 to 5		
	2.2	Programs and project plan/s activities are monitored to identify and respond to variations in accordance with risk management processes and workplace procedures			Risk Assessment Project Report
	2.3	Agreed risk responses are implemented and plans modified to reflect changing project objectives in accordance with risk management processes and workplace procedures			Risk Assessment Project Report
3 Evaluate risk management strategies.	3.1	Project outcomes are reviewed with relevant person/s to determine effectiveness of risk management processes in accordance with workplace procedures			Risk Assessment Project Report
	3.2	Risk issues and recommended improvements are identified, documented and submitted to relevant person/s for approval to be incorporated into ongoing and/or future program or project plans			

Performance Evidence	Test	Assignment Questions & Answer	Project Assignment / Report
LV Safety		Q 13 to 16 Page 2 of Advanced Diploma in Electrical Engineering Exercise	
Electrical Installation Safety		Q 19/20 Page 2 of Advanced Diploma in Electrical Engineering Exercise	
Safety in Substation		Q 17/18 Page 2 of Advanced Diploma in Electrical Engineering Exercise	

Knowledge Evidence	Test	Assignment Report	Project Assignment / Report
T1 The need for risk management within the broad project management framework		Q8 to 12 Page 2 of Advanced Diploma in Electrical Engineering Exercise	
T2 Risk management methodologies, their capabilities, limitations, applicability and outcomes		Q8 to 12 Page 2 of Advanced Diploma in Electrical Engineering Exercise	
T3 Uncertainty and the means of measurement			Risk Assessment Project Report
T4 The application of risk management tools and techniques	Test 1 Q 1+2		
T5 Risk management in the context of the project life cycle and other project management functions			Risk Assessment Project Report
T6 Implementing risk management			Risk Assessment Project Report

Add rows to the following table as required

Assessment Conditions	Insert	Insert	Insert
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	Assessment event 1	Assessment event 2	Assessment event 3
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This document is to be viewed concurrently with C007 Attached
Click [HERE](#)

Faculty:		College:	
Teaching Section:	Electrical Engineering		
Qualification Number and Name:	UEE62122 Advanced Diploma of Engineering Technology-Electrical/ UEE62220 Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEECD0039 Provide solutions to basic engineering computational problems		

Copy and paste the following table for each element as required

Elements & Performance Criteria		Assessment event(s)			
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Report	Practical
1. Provide computational solutions to engineering problems.	1.1	Work health and safety (WHS)/occupational health and safety (OHS) processes and workplace procedures for a given work area are identified, obtained and applied	Concurrently assessed with UEENEEE101A /UEECD0007		
	1.2	Scope of problem/s is obtained from documentation and/or from work instructions to determine work	Test 3 Q 1/2/3		
	1.3	Problems are documented and/or diagrammatic form and appropriate methods identified to resolve them	Test 1B Q7		
	1.4	Constants and variables to the problem are obtained from measured values and/or problem documentation	Test 1B Q 1/2		
	1.5	Alternative methods for resolving the problem are considered and, as required, discussed with relevant person/s		Q37 Advanced Diploma in Electrical Engineering Exercises Page 37 Method1- Simultaneous equation method Method 2-Matrice Solution	
	1.6	Problems are resolved using mathematical processes in accordance with workplace procedures		Q117 to 120 Advanced Diploma in Electrical Engineering Exercises Page 39	

Elements & Performance Criteria		Assessment event(s)			
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Report	Practical
2.Complete work and document problem solving activities	2.1	Justification for solutions used to solve engineering problems is documented in work records in accordance with workplace procedures and relevant industry standards	Test 3 Q 1/2/3 Test 2B Q7 Test 2 Q6		
	2.2	Work completion is documented and relevant person/s notified in accordance with workplace procedures		All assignments submission	

Performance Evidence	Test	Assignment Report	Practical
Applying mathematics in electrical problems solving			Test 3 Q 1/2/3
Applying mathematics in mechanical problems solving	Test 2B Q7		
Applying mathematics in financial problems solving	Test 1B Q7		
Applying mathematics in electronic problems solving			Test 2 Q6

Knowledge Evidence	Test	Assignment Report	Practical
T1 Rational, irrational numbers and basic algebra	Test1B Q1/2		
T2 Algebraic manipulation	Test1B Q1/2		
T3 Laws of indices	Test 1B Q3		
T4 Estimations, errors and approximations		Q117 to 120 Advanced Diploma in Electrical Engineering Exercises Page 39	
T5 Plane figures – triangles and basic trigonometry	Test 2B Q2,5,6		

Knowledge Evidence	Test	Assignment Report	Practical
T6 Plane figures - quadrilaterals and circles		Q55 to 63 Advanced Diploma in Electrical Engineering Exercises Page 39	
T7 Graphs of Trigonometric functions	Test 2B Q8		
T8 Graphs of linear functions	Test 2B Q4,6		
T9 Simultaneous equations		Q37 Advanced Diploma in Electrical Engineering Exercises Page 37	
T10 Matrices	Test 3 Q6		
T11 Quadratic functions	Test 1B Q 1/2		
T12 Exponential and logarithmic functions	Test 1 Q 2		
T13 Vectors and Phasors	Test 3 Q6		
T14 Complex numbers	Test 3 Q1		

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. Gather evidence to demonstrate consistent performance in conditions that are safe and replicate the workplace. Noise levels, production flow, interruptions and time variances must be typical of those experienced in the administration – general administration field of work and include access to: <ul style="list-style-type: none"> Electrical equipment and resources records relating to business resources 			

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Signature

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Teaching Section:	Electrical Engineering		
Qualification Number and Name:	UEE62111 Advanced Diploma of Engineering Technology-Electrical/ UEE62211 Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEECD0059 Write specifications for electrical engineering projects		

Copy and paste the following table for each element as required

Elements & Performance Criteria		Assessment event(s)			
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Questions & Answers	Project Assignment/Report
1 Prepare specification requirements.	1.1	Work health and safety (WHS)/occupational health and safety (OHS) processes and workplace procedures for a given work area are identified, obtained and applied			Project safety audit report
	1.2	Techniques for specification writing are reviewed and applied in accordance with workplace procedures		Q2,4,7,8,9 of Advanced Diploma Electrical Engineering Exercises Page 65	
	1.3	Relevant person/s is consulted and/or site visits conducted to identify other works impacting on specification			Q14, 23 of Advanced Diploma Electrical Engineering Exercises Page 65 Q30 to 33 of Advanced Diploma Electrical Engineering Exercises Page 65
2 Write specification.	2.1	Specification is developed to include scenarios/requirements in consultation with relevant person/s and in accordance with relevant industry standards			Q37,38,41 of Advanced Diploma Electrical Engineering Exercises Page 65
	2.2	Specification is developed in collaboration with relevant design professional/s and/or contractor/s involved in the project			Q51, 54 of Advanced Diploma Electrical Engineering Exercises Page 65
	2.3	Relevant person/s required for the project is identified and their role/s specified in the specification			Q49 to 60 +69 of Advanced Diploma Electrical Engineering Exercises Page 65
	2.4	Specification is reviewed against all inputs and adjusted to rectify any anomalies			Practical Assignment
	2.5	Specification is developed in accordance with workplace procedures		Q2,4,7,8,9 of Advanced Diploma Electrical Engineering	

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Questions & Answers	Project Assignment/Report
				Exercises Page 65	
3. Approval of specification is obtained.	3.1	Specification is presented and discussed with relevant person/s		Q2,4,7,8,9 of Advanced Diploma Electrical Engineering Exercises Page 65	
	3.2	Alterations to the specification resulting from the discussion are negotiated with relevant person/s in accordance with workplace procedures			Practical Assignment
	3.3	Specification is finalised and approval obtained from relevant person/s			Practical Assignment

Performance Evidence	Test	Assignment Questions & Answer	Project Assignment / Report
Power Project Specification task -Project brief, project plan, project outline & relevant specifications			Project
Power Project Specification task-Risk assessment, project procedure & relevant specifications			Project
Project Specification Assessment- Project variation, project report & relevant specifications			Project

Knowledge Evidence	Test	Assignment Report	Project Assignment / Report

Knowledge Evidence	Test	Assignment Report	Project Assignment / Report
T1 Electrical engineering specifications		Q37,38,41 of Advanced Diploma Electrical Engineering Exercises Page 65	
T2 Dealing with suppliers and manufacturer's		Q15,16,36 of Advanced Diploma Electrical Engineering Exercises Page 65	
T3 Using basic computers functions			Project
T4 Research skills			Project

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Teaching Section:	Electrical Engineering		
Qualification Number and Name:	UEE62122Advanced Diploma of Engineering Technology-Electrical/ UEE62220 Advanced Diploma of Electrical Engineering		
Unit of Competency Number and Name:	UEEEL0058 Plan large electrical projects		

This unit is concurrently assessed with UEEEL0015 Manage large electrical projects.+ UEECD0014 - Develop design briefs for electrotechnology projects +UEECO0001 - Estimate electrotechnology projects +

UEECO0002 Maintain documentation

UEECO0015 Provide quotations for installation or service jobs

UEECO0017 Source and purchase material/parts for installation or service jobs

Copy and paste the following table for each element as required

Elements & Performance Criteria		Assessment event(s)			
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Questions & Answers	Project Assignment/Report
1 Prepare to plan project	1.1	Work health and safety (WHS)/occupational health and safety (OHS) processes and workplace procedures for a given work area are identified, obtained and applied			Project safety audit report
	1.2	Project planning techniques are reviewed and adopted in accordance with workplace procedures		Q37 of Page 210 Advanced Diploma Electrical Engg Exercise	
	1.3	Scope of the project is identified from design brief specification and/or relevant documentation and from discussions with relevant person/s	Test 1 Question 8 Test 1 Question 4,7		Role Playing Task Activity -Change of technical requirement variation-Technical
2. Develop project plan proposal.	2.1	Estimated plant, material, labour and related costs are sought from relevant person/s in accordance with workplace procedures	Test 1 Question 5 Test 1 Question 9		
	2.4	Sources and availability of materials and resources needed for the project are identified in accordance with workplace procedures	Test 2 Question 7		
	2.3	Critical path analysis is applied to develop workflow strategies	Test 1 Question 10/11		
	2.5	Risk management strategies are sought and obtained for incorporating in the project plan	Test 1 Question 9		

Elements & Performance Criteria			Assessment event(s)		
Element(s)	PC No	Performance Criteria (PC)	Test	Assignment Questions & Answers	Project Assignment/Report
	2.6	Project plan is reviewed against all inputs and adjusted to rectify any anomalies			Project Report
	2.7	Project plan proposal is documented in accordance with workplace procedures			Project Report
		Procurement processes and procedures are monitored to ensure on time supply of plant and materials and in accordance with organisation's policy.			
	2.2	Project budget is established from estimated plant, material, labour and related costs in accordance with workplace procedures	Test 2 Question 1+2		
3. Obtain approval for project plan.	3.2	Alterations to the project plan resulting from the presentation/discussion are negotiated with relevant person/s in accordance with workplace procedures	Test 2 Question 3		
	3.1	Project plan is presented and discussed with relevant person/s			Project Report
	3.3	Final project plan is documented and approval obtained from relevant person/s			Project Report

Performance Evidence	Test	Assignment Questions & Answer	Project Assignment / Report
Power Project task -Project brief, project plan, project outline,			Project
Power Project task-Risk assessment, project procedure			Project
Project Assessment- Project variation, project report			Project

Knowledge Evidence	Test	Assignment Report	Project Assignment / Report
T1-Project planning			Project Report
T2-Purpose of project planning		Q37 of Page 210 Advanced Diploma Electrical Engg Exercise	
T5-Financial management encompassing:		Financial Management Assignment Report	
T4-Time management			Project Report
T6-Quality management	Test 2 Q1		
T7-Human Resource management		Q61,62,63,64,65,66, 67 of Page 209 Advanced Diploma Electrical Engg Exercise (13) Management leadership	
T8-Communication management concepts and practices within a project			Role playing regarding communication actions
T9-Risk management and contingencies encompassing:		Q5 of Page 2 Advanced Diploma Electrical Engg Exercise	
T10-Procurement management concepts and practices		Q43 of Page 209 Advanced Diploma Electrical Engg Exercise (9) Software development project	

Knowledge Evidence	Test	Assignment Report	Project Assignment / Report
T11- Physical Resources Management		Q22 to 27 of Page 207 Advanced Diploma Electrical Engg Exercise	
T3-Defining project parameters	Test 1 Q5		
T12-Contracts		Q2 of Page 65 Advanced Diploma Electrical Engg Exercise	
T13-Performance assessment and continuous improvement		Q68 to 71 of Page 212 Advanced Diploma Electrical Engg Exercise	
T14-Engineering ethics principles		Q69 of Page 71 Advanced Diploma Electrical Engg Exercise	
T15-Customer/Client relations		Q13,14,15 of Page 208 Advanced Diploma Electrical Engg Exercise	
T17- Critical path and project analysis	Test 1 Question 10/11		
T16+T18-Electrical industry sector customs and practice		Q3.15.16 of Page 66Advanced Diploma Electrical Engg Exercise	

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Source and purchase material/parts for installation or service jobs

UEECO0017		Source and purchase material/parts for installation or service jobs	
1 Determine relevant materials/parts to purchase	1.1	Work health and safety (WHS)/occupational health and safety (OHS) procedures for a given work area are identified, obtained and applied in accordance with workplace procedures	Purchasing activities to be assessed
	1.2	WHS/OHS risk control measures and workplace procedures are followed	
	1.3	Scope of installation or service work is determined from job specification drawings and/or results of service calls	
	1.4	Materials/parts required for work are determined from job specifications or service calls	
	1.5	Materials/parts required are documented in accordance with workplace procedures	
2 Procure materials/parts	2.1	Source of materials/parts are determined based on availability and price in accordance with workplace procurement procedures	
	2.2	Approval to purchase alternative materials/parts is sought from supervisor in accordance with workplace procurement procedures	
	2.3	Prices for the supply of materials/parts, particularly non-standard high-cost items, is sought in accordance with workplace procurement procedures	
	2.4	Approval to purchase materials/parts is obtained in writing from the customer or relevant person/s in accordance with workplace procurement procedures	
	2.5	Purchases are initiated based on price and availability of materials/parts within the required timeframe and in accordance with workplace procurement procedures	

	2.6	Appropriate information technology is used to source and purchase materials/parts	
3 Document materials/parts purchases	3.1	Materials/parts purchased are allocated against the appropriate jobs	
	3.2	Materials/parts purchases are documented in accordance with workplace procurement procedures	

			UEECO0002 Maintain documentation	
1	Prepare to maintain documentation	1.1	Documentation requirements and record management methods are identified, obtained and applied in accordance with workplace procedures	Document maintaining and filing activities to be assessed
		1.2	Advice is sought from supervisor, as required, to ensure work activity is correctly documented and coordinated with other person/s	
		1.3	Forms required to document work activity are obtained in accordance with workplace procedures	
		1.4	Work health and safety (WHS)/occupational health and safety (OHS), risk assessment and control measures are documented in accordance with workplace procedures	
2	Maintain documents	2.1	Work activities are documented, at the appropriate time and in accordance with workplace procedures	
		2.2	Documents are checked for accuracy, clarity and anomalies corrected	
		2.3	Appropriate information technology is used to maintain workplace documentation	
		2.4	Signatures are obtained by relevant person/s, as required	
		2.5	Copies of required documents are forwarded to appropriate person/s in accordance with workplace procedures	
		2.6	Unplanned events are referred to supervisor for direction in accordance with workplace procedures.	

		UEECO0015		Provide quotations for installation or service jobs
Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.		
1	Determine extent of installation or service work	1.1	Scope of electrotechnology installation or service project work is determined from job specifications and discussions with customer and/or relevant person/s	Providing quotation activities to be assessed
		1.2	Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures for the project work area are identified and applied	
		1.3	WHS/OHS and regulatory requirements are assessed and incorporated in the work specification on which the quotation is based	
		1.4	Scope of installation or service work for quotation is documented as a job specification and agreement sought with customer and/or relevant person/s	
		1.5	Requests for alterations to job specification are negotiated with customer and/or relevant person/s in accordance with workplace procedures and regulatory requirements	
2	Develop installation or service work quotation	2.1	List of materials are determined accurately and checked against job specification	
		2.2	Materials, labour and other relevant service and margin costs are determined in accordance with workplace costing parameters and material supplier costs	
		2.3	Quotation is quantified and costed against job specification and list of materials for costing	

			accuracy in accordance with workplace procedures	
		2.4	Unplanned customer situations are responded to in accordance with workplace procedures in a manner that minimises risk to service project	
		2.5	Installation or service work quotation is reviewed and approved by delegated person in accordance with workplace procedures	
3	Document and submit installation or service quotation	3.1	Quotation is documented in accordance with workplace policies and procedures	
		3.2	Quotation is submitted to customer within specified timeframes	